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The Editor will be glad to receive publications relating to Veterinary Science and cognate subjects in order that they may be dealt with in the *Veterinary Bulletin.*

Reports of Departments, Special Reports, reprints, etc., etc., should be sent as soon as they are issued.

Books for Review.

The Editor will be glad to receive books for review in the *Veterinary Bulletin.*

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin.* Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

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IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

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DISEASES CAUSED BY BACTERIA AND FUNGI

HELL, H. (1937). Die Immunotherapie des gelben Galtes. Ein Versuch über eine lokale Immunbehandlung des Galtes mit " Mastitex ", einem "Antivirus "-Präparat nach Besredka. [**Immunotherapy of Streptococcal Mastitis with " Mastitex "**].—*Inaug. Diss., Hanover.* pp. 47. [Numerous refs.]

" Mastitex " is a proprietary preparation stated to contain immune bodies specific for mastitis streptococci, Besredka's antivirus against streptococci, and a stimulant. Twenty-nine affected quarters of 13 cows were treated ; 100 c.c. were injected *via* the teat into the affected quarter in the afternoon and left there until the next morning. There was no reaction of the treated quarters after the injection ; ten quarters were cured, whilst 19 were not cured even by three treatments. H. concludes that the preparation is not of value for curative treatment or of use for producing immunity in quarters affected with streptococcal mastitis.—A. W. M.

HAUDUROY, P. (1938). Une nouvelle tentative de classification des streptocoques ; son importance clinique. [**A New Method of Classifying Streptococci ; Its Clinical Importance**].—*Pr. méd.* Sept. 10th. 1346-1348. [11 refs.]

After referring briefly to some of the various methods used in the differentiation of streptococci, H. gives a short account of the current (1938) state of Lancefield's classification with regard particularly to its clinical value. The article will be of more value to clinicians than to bacteriologists.—A. W. STABLEFORTH.

BRADLEY, W. H. (1938). **The Spread of Streptococcal Disease.**—*Brit. med. J.* Oct. 8th. 733-738. 5 figs. [10 refs.]

Studies on streptococcal epidemics are described. Epidemics are usually due to one Griffith type of streptococcus and there is no evidence of any cross immunity between types. The great bulk of streptococcal disease is associated with a raised carrier rate, the enhanced parasitism being due to one, or at most a few types, at any given time. The majority of carriers are infected for a short period only, but they are of greater importance in the spread of disease than persons with chronically infected foci.—J. FRANCIS.

CRUIKSHANK, R., & GODBER, G. E. (1939). **The Aerial Spread of Streptococcal Infections.**—*Lancet.* **236.** 741-746. [Numerous refs.]

Review is given of the evidence concerning the aerial spread of organisms derived from infective discharges from various sources as well as from the respiratory tract. Bacteriological and epidemiological observations on streptococcal infections convinced the authors that the aerial transmission of pathogenic bacteria can be

an important factor in the spread of infection. The possibility of air-borne streptococcal infection can be minimized by free ventilation of the polluted air and the removal of infected dust by damp sweeping and dusting.—R. O. MUIR.

VAN GOIDSENHOVEN, C., & SCHOENAERS, F. (1939). La tuberculose du chien. **[TB. in the Dog].**—*Ann. Méd. vét.* **84.** 337-348. [Numerous refs.]

The percentage incidence of TB. in dogs as estimated by various observers, based on clinical examination and P.M. findings is summarized. In Germany, the incidence in dogs slaughtered for food is stated to be 0·4%. The means of diagnosis, including clinical examination, the tuberculin test and the complement-fixation test are discussed.

The limitations of the value of the subcutaneous tuberculin test and the failure of the intradermal test in dogs are noted. Emphasis is laid on the value of the complement-fixation test.

In the dog infection *per os* and by the respiratory tract occurs to about an equal extent. The incidence of the different types of tubercle bacilli in canine cases is discussed.

It is noted that TB. in the dog is almost exclusively due to bacilli of the human or bovine types, approximately two-thirds of the cases being due to the former.—H. BURROW.

TUNKL, B. (1939). O dijagnostici uzročnika tuberkuloze. (Disertaciona radnja iz go d. 1939). **[Diagnosis of Tuberculosis].**—*Vet. Arhiv.* **9.** 382-402. [Numerous refs.] [French summary].

T. compared the value of Löwenstein's and Petragnani's media for isolating types of *Mycobacterium tuberculosis*, using 25 human sputa and material from 32 cattle, two pigs, five dogs, ten rabbits and two fowls (the rabbits and fowls having been infected with the avian type bacillus). The organism was isolated in pure culture on Löwenstein's medium in 59 cases, and on Petragnani's in 71. The latter medium, prepared with varying stated amounts of glycerin or without glycerin, is suitable for the isolation of the bovine, human and avian types, and to a certain extent for their differentiation, as their rate of growth differs according to the glycerin content of the medium.

The comparative values of different diagnostic methods were tested on 45 human sputa and material obtained from 63 cattle, two pigs and five dogs. Tubercle bacilli were detected by direct microscopic examination in 48 of the samples. Relative concentration with anti-formin of the 67 microscopically negative samples revealed tubercle bacilli in a further 14 samples (21·8%); culture on Petragnani's medium gave growth in a further 50 samples (74·5%).

Growth was obtained on Petragnani's medium with glycerin from 105 of the above 115 samples (91·3%). Animal experiments with the same material gave positive results in 108 cases (93·1%).

One sample of porcine material was negative by inoculation into a g. pig, and positive by the cultivation method.

T. concluded that Petragnani's medium is preferable to Löwenstein's medium for the isolation of all three types of *M. tuberculosis*, and particularly of the bovine type.—B. OSWALD (KRIŽEVCI).

I. CARMICHAEL, J. (1938). **Tuberculosis of Sheep in Uganda.**—*Vet. Rec.* **50.** 1138-1147. 1 fig., 2 tables. [Numerous refs.]

II. CARMICHAEL, J. (1938). **Tuberculosis of Goats in Uganda.**—*Ibid.* 1147-1154. 1 fig., 7 tables. [20 refs.]

I. C. gave a survey of the literature on the subject. This appears to be the first record of TB. in the native African sheep. Twelve cases were examined, 11 of which were caused by the bovine type, and one by the human type of tubercle bacillus.

The occurrence of TB. in sheep is of considerable importance from the public health aspect. The African native lives in very close proximity to his sheep and goats and infection of man may readily occur or *vice versa*.

In most cases there was a marked absence of clinical symptoms, although advanced pulmonary lesions were observed on P.M. examination. One case proved to be caused by a typical eugonic human strain. Advanced TB. was observed in both lungs and the associated lymph nodes; tubercles were also observed in the spleen. The animal was in excellent bodily condition. Nine out of 15 sheep reacted to the double intradermal test with bovine tuberculin. Tuberculous lesions in varying stages were observed in the lungs or associated lymph nodes of seven of these animals; nodules containing caseo-calcareous material were found and numerous acid-fast organisms were generally demonstrable. In two animals lesions were confined to the liver; a typical dysgonic bovine strain was isolated from one of these. In two further cases pulmonary lesions were found. In one, the mediastinal lymph nodes were enlarged and caseous; in the other, both lungs contained masses of caseous material, and cavity formation was observed.

II. A survey of the literature on this subject is given. Although there is no record of TB. among the indigenous goats of tropical Africa, the disease appears to be not uncommon.

The P.M. and bacteriological examination of ten goats is reported. Eight of these goats reacted to the double intradermal tuberculin test, and in six animals lesions of a benign type were demonstrated in the lungs and mediastinal glands. Dry, caseous material and some calcification were usually observed in the lesions. All these goats were in excellent condition at the time of examination. One goat, reacting to tuberculin, showed considerable distension of the lungs, and there were numerous small abscesses with cavity formation present; this animal was also in good condition. In two cases, however, the disease was manifested in a more acute form. One goat was found dead in an emaciated condition. The left lung was mottled and contained five abscesses up to the size of a walnut with dry, yellow, caseous material therein. The main lobe of the right lung showed extensive cavity formation. The mediastinal glands were soft and caseous, but there was no calcification. The spleen contained one nodule. In the second case a temperature of 105°F. was recorded with a rapid and thready pulse. The mediastinal lymph nodes were greatly enlarged and pleuritic adhesions were observed over both lungs. Dry, caseous nodules were present in the spleen and numerous caseous tubercles were scattered throughout the liver. In all cases the causal organism was proved to be of the bovine type.—E. C. Hulse.

Smithburn, K. C. (1939). **Acute or Chronic Tuberculous Lesions as Produced by Colonial Variants of Tubercle Bacilli.**—*Tubercle, Lond.* **20.** 420-425. 2 tables. [9 refs.]

Four variants, characterized by distinctive colonial features, were obtained by growing a single strain of the bovine type tubercle bacillus throughout seven cultural generations on Corper's glycerolated egg-yolk medium, adjusted by addition of phosphate buffers to pH values of 6·0, 6·4 and 7·2. The P.M. results of inoculation of ten rabbits intravenously and 12 male g. pigs intracerebrally with each line of culture showed that the coarsely granular colonies produced by culture at pH 6·0 were markedly attenuated, causing only slight caseation, whereas the

smooth colonies resulting from culture at pH 6·8 were highly virulent, producing advanced caseation. Cultivation at pH 6·4 and 7·2 respectively yielded granular colonies of moderate attenuation in the one case and finely granular, flat colonies of only slight attenuation in the other.—R. O. MUIR.

McCARTER, Janet, & HASTINGS, E. G. (1939). **The Presence of Avian Tubercle Bacilli in apparently Pure Cultures of Diphtheroids.**—*J. infect. Dis.* **64.** 297-301. 1 table. [15 refs.]

Several chromogenic diphtheroid species were isolated on egg slopes in macroscopically pure culture from bovine and porcine lymph nodes without gross tuberculous lesions. Microscopic examination of some of these cultures demonstrated an intermixture of acid-fast bacilli. Injection of g. pigs, rabbits and chickens with these impure diphtheroid cultures showed that the acid-fast bacilli were virulent avian type tubercle bacilli and some cultures produced experimental tuberculosis even although acid-fast bacilli could not be detected microscopically in them. Sub-culture of these impure diphtheroid cultures for several years resulted in ultimate inability to produce tuberculosis. Avian tubercle bacilli were shown to be able to grow commensally with pure cultures of the diphtheroids even when inoculated in equal numbers. After a discussion on the commensal growth of tubercle and leprosy bacilli with diphtheroid and other bacteria, the authors stress the necessity of animal inoculation for the identification of acid-fast cultures, and also of culturing the tissues of inoculated animals which exhibit no visible lesions.—R. O. MUIR.

MILLS, M. A., & COLWELL, Charlotte A. (1939). **Tubercle Bacilli Suspended in Gastric Mucin. Their Pathogenicity for Guinea Pigs.**—*Amer. Rev. Tuberc.* **40.** 109-113. 1 table. [7 refs.]

Thirty g. pigs were injected subcutaneously with 0·000005-0·25 mg. of human type tubercle bacilli suspended in 0·5 c.c. of 0·9% saline solution, and 30 with similar doses of bacilli suspended in 0·5 c.c. of commercial gastric mucin. No significant differences were noted in either group in those g. pigs injected with doses of 0·005-0·25 mg. In those injected with doses of 0·000005-0·0005 mg. of tubercle bacilli, on the other hand, the average size of the lesions in the g. pigs injected with mucin was approximately twice that of the lesions in the saline controls. Moreover, 69% of the lesions in the mucin series ulcerated compared with only 19% of the lesions in the saline controls. The viscosity of the mucin rather than any specific chemical action was considered by the authors to be the significant factor in temporarily maintaining a high concentration of bacilli at the site of injection.—R. O. MUIR.

MURTHY, K. S. (1937). **Work on Johne's Disease in Mysore State.**—*Proc. Husb. Res. Wkrs Conf. India, 1936.* pp. 82-87. Discussion pp. 87-88. 1 table.

The experimental herd of cattle was divided into two groups: the first group included animals suspected of being affected, and these were later segregated at a separate farm; the second group consisted of animals which had been tested and failed to react. The most satisfactory growth was obtained with ordinary peptonized agar, to which 10% of *Mycobacterium phlei* had been added.

The value of johnin in diagnosis, when given intravenously and intradermally, was compared; it was found that the intravenous method was the more reliable.

It is stated that if Johne's disease is not controlled it is likely to become a grave menace in India.

MORRILL, C. C. (1939). **Erysipeloid Occurrence Among Veterinary Students.**—*J. infect. Dis.* **65.** 322-324. [6 refs.]

M. reviews the literature concerning the occurrence of infection of man with organisms of the genus *Erysipelothrix*, and reports 12 cases of an infection, believed to be erysipeloid, which occurred between 1936 and 1939 amongst veterinary students at Kansas State College. It was believed that the sources of infection were horse cadavers which were being used for dissection. In 1939 four students were treated and from one of them, and from the cadaver on which he was working, *Erysipelothrix rhusiopathiae* (the bacillus of swine erysipelas) was isolated. This was proved by agglutination and serum protection tests.—J. R. LAWSON.

RAJAGOPALAN, V. R., & GOPALASKRISHNAN, V. R. (1939). **Pasteurellosis in White Mice.**—*Indian J. vet. Sci.* **9.** 299-307. 2 figs. on 1 plate, 5 tables. [11 refs.]

This article comprises a description of some of the cultural, biochemical and serological characteristics of a short, aerobic, non-sporulating, non-motile, non-acid-fast, Gram-negative rod, which was isolated from mice dying in an epizootic amongst these animals at Muktesar. The biochemical and serological properties of this organism are compared with those of stock strains kept at the laboratory. A brief report is given of the P.M. findings in the affected mice.

The results obtained indicated that the organism isolated is a member of the genus *Pasteurella* and is very closely related to *Past. muricida*.—L. E. HUGHES.

KOROBKOVA, E. I. (1937). Grundimmunizatsiya zhivotnykh zhivyrni avirulentnymi kulturami chumy. [**Use of Avirulent Strains of** *Pasteurella pestis* **in Preparation of Plague Anti-Serum**].—*Rev. Microbiol., Saratov.* **16.** 265-272. 3 tables, 1 graph. [French summary].

The use is advocated of avirulent strains instead of dead cultures in the preliminary immunization of animals to be hyperimmunized for the production of antiserum against *Past. pestis*. The serum producers develop the necessary titre in less than half the time taken when dead cultures are used.—E. MARTIN.

TUMANSKIĬ, V. M. (1937). K voprosu ob izmenchivosti B. pestis pod vliyaniem bakteriofaga. I. Perekhod B. pestis v B. pseudotuberculosis rod. Pfeiffer'a. [**Variability of** *Pasteurella pestis* **under the Influence of Bacteriophage. I. Transmutation of** *Past. pestis* **into** *Past. pseudotuberculosis rodentium*].—*Rev. Microbiol., Saratov.* **16.** 287-300. 3 tables. [4 refs.] [French summary].

Nineteen strains of *Past. pestis* were subjected to the action of specific bacteriophages. After 43 days it was observed that one of the strains produced a culture with characteristics more closely resembling *Past. pseudotuberculosis* than *Past. pestis*. This character was maintained in subcultures or agar and other media.

In animal tests the modified strain was lethal for rabbits, while the original strain was non-pathogenic.

T. believes this to be a genuine case of transmutation of *Past. pestis* into *Past. pseudotuberculosis*, under the influence of a *Past. pestis* bacteriophage.—E. MARTIN.

OLSUF'EV, N. G. (1939). Rol' paraziticheskovo faktora v epidemiologiitularemii. [**The Part Played by Parasites in the Epidemiology of Tularaemia**].—*Tez. Dokl. vsesoyuz. Konf. Mikrobiol., Epidemiol., Infekt., Moskva, 1939.* pp. 132-134. Moscow: Medgiz.

Investigation by various research institutes in the U.S.S.R. of the part played by various parasites in the transmission of tularaemia showed that the main agents

responsible for the preservation and transmission of *Bact. tularense* among rodents were *Ixodes* ticks and lice, and to a lesser extent fleas, mites of the Gamasidae family and mosquitoes ; in the transmission of the virus from rodents to susceptible domestic animals *Ixodes* ticks, mosquitoes, and to a lesser extent, " gadflies " ; finally, in the transmission to human beings, " gadflies ", mosquitoes, and to a lesser extent, *Ixodes* ticks and bed-bugs, all in the order given.—E. MARTIN.

DINGLE, J. H., & FOTHERGILL, L. D. (1939). **The Isolation and Properties of the Specific Polysaccharide of Type B** *Hemophilus influenzae.—J. Immunol.* **37.** 53-63. 5 tables. [4 refs.]

The organism was grown on a relatively simplified medium, the composition of which is given in detail. The chemical methods employed in the isolation of the polysaccharide are described and some of the chemical properties and composition of the substance obtained.

The substance obtained proved to be precipitated from solution when mixed with a homologous antiserum in high dilutions. The antisera used were prepared in horses and rabbits from the whole organism. The reaction obtained with the rabbits' sera was specific. It was found that there was cross precipitation with anti-pneumococcal and anti-meningococcal horse sera often in a dilution of polysaccharide as high as 1:100,000.

The authors show that this cross reaction is unlikely to be due to a reaction with the pneumococcus " C " substance, although they observe that it is possibly due to the presence of an antigen common to *H. influenzae* and the meningococcus and similar to the " C " substance since cross-absorption tests of anti-*H. influenzae* and anti-meningococcal sera with homologous and heterologous organisms removed most of the anti-" C " precipitating substances in these sera.

Attempts to show that the cross-absorption phenomena with sera prepared in horses were due to an impurity in the polysaccharide, failed ; the results of these tests indicated that the reactions took place between the specific *H. influenzae* polysaccharide and some non-specific factor present in certain horse antisera.

—L. E. HUGHES.

LOGSDON, C. D. (1939). **Bang's Disease Apparently Spread by an Infected Horse.**—*Vet. Med.* **34.** 164.

A herd became infected with brucellosis. Infection was considered to be due to a contact horse which was found to be a positive reactor.—J. A. GRIFFITHS.

BEATTIE, C. P., BEATTIE, M. H., & AL ZAHAWI, S. (1939). **Brucellosis in Iraq.** —*Trans. R. Soc. trop. Med. Hyg.* **33.** 173-182. 4 tables, 1 graph. [18 refs.]

In 1938 AL ZAHAWI recorded brucellosis in Iraq. The authors tested blood and milk samples from cattle, goats and sheep for brucella agglutinins. There were positive results in 61% of all the blood and in 23% of all the milk tests. Cultures, as well as inoculations into g. pigs, were made with the positive milk samples. No positive results were, however, obtained by either method.

Human infection was also found to be relatively common.

I. GÖTZE, R. (1938). Ueber die Durchführung des Absonderungs- und Ausmerzverfahrens zur Bekämpfung der Rinderbruzellose in verseuchten Bestanden. **[The Segregation System of Control of Bovine Brucellosis].**—*Berl. tierärztl. Wschr.* March 11th. 141-145.

II. EULER. (1938). Praktische Vorschläge für das Abortus-Bekämpfungsverfahren auf Grund der in Ostpreussen gemachten Erfahrungen. **[Practical**

Suggestions for the Control of Contagious Abortion Based on Experience in East Prussia].—*Dtsch. tierärztl. Wschr.* **46.** 673-676.

I. A detailed description of the usual hygienic and segregation methods adopted for the control of abortion. The necessity for repeated blood sampling at short intervals (fortnightly in herds in which an epidemic is occurring) is emphasized.

II. A dissertation on the necessity of controlling abortion, the arguments to use to farmers, and the methods to adopt (blood testing and hygienic precautions). No new facts are given.—P. S. WATTS.

MANGRULKAR, M. Y. (1938). **Actinomycosis, and Actinobacillosis in Animals in India.**—*Indian J. vet. Sci.* **8.** 271-291. 20 figs. on 6 plates. [Num. refs.]

M. gave a general survey of actinomycosis and discussed specimens collected in India and examined at the Imperial Veterinary Research Institute, Muktesar. —JOHN FRANCIS.

DISEASES CAUSED BY PROTOZOAN PARASITES

CHABAUD, A. (1939). Infection de l'embryon de poule par quelques trypanosomes pathogènes. [**Infection of Fowl Embryos with some Pathogenic Trypanosomes**].—*Bull. Soc. Path. exot.* **32.** 489-492. [1 ref.]

C. shows that *Tryp. brucei*, *Tryp. equinum* and *Tryp. rhodesiense* multiply rapidly in the blood of chick embryos. It was noticed occasionally that after a septicaemia at the seventh or eighth day there was a progressive disappearance of trypanosomes from the circulating blood. The chick embryos, however, did not die before hatching. Like the spirochaetes [see *V. B.* **10.** 419.], although *Tryp. brucei*, *Tryp. rhodesiense* and *Tryp. equinum* find a favourable medium for growth in chick embryos, yet they do not grow in adult chickens. *Tryp. lewisi* does not seem to be capable of growing in living chick embryos.—A. L. WILSON.

CORSON, J. F. (1939). **A Final Note on a Strain of** *Trypanosoma gambiense* **Transmitted through Monkeys by** *Glossina morsitans*.—*Ann. trop. Med. Parasit.* **33.** 91-93. 1 table. [4 refs.]

Attention is drawn to a miscalculation in a previous article [CORSON (1938). *Ann. trop. Med. Parasit.* **32.** 245. (*V. B.* **9.** 693.)], and to the chronic course which infection with *Tryp. gambiense* can take in the monkey. In one case trypanosomes could only be detected on very rare occasions after the examination of 200 fields of a thick film. On slaughter of the monkeys remaining at the end of the experiments, it was found that the cerebrospinal leucocytic counts indicated that some of those believed to have recovered were still probably infected. In view of the probability that similar light chronic infections may occur in man, all human volunteers should be treated even if no infection has been detected.—U. F. R.

BROOM, J. C., & BROWN, H. C. (1939). **Studies in Trypanosomiasis. III. The Electric Charge of Trypanosomes in the Salivary Glands of Tsetse Flies.**—*Trans. R. Soc. trop. Med. Hyg.* **32.** 545-548. 1 table. [3 refs.] [For part II see *V. B.* **9.** 305].

The authors, working with strains of positively and negatively charged *T. brucei* initiated by the inoculation of single organisms into rats, found that, whatever the charge of the blood forms, the organisms developing in the gut of

Glossina morsitans were negatively charged, whilst those developing in the salivary gland were positively charged.

Salivary gland forms die rapidly in saline-glucose solution and in order to allow of observation Ringer's solution had to be substituted for physiological saline. The sign of the charge of the trypanosomes was judged by their adherence to the red blood corpuscles of mice, positively charged organisms becoming firmly adherent to the corpuscles, whilst negatively charged ones remain free.—U. F. R.

ROUBAUD, E., & PROVOST, A. (1939). Infection inapparente de la poule par *Trypanosoma rhodesiense*. [**Inapparent** *Tryp. rhodesiense* **Infection in the Hen**].—*Bull. Soc. Path. exot.* **32.** 807-809. [7 refs.]

The authors inoculated *T. rhodesiense* from mice into the wattles of two fowls. No infection could be detected in one bird. In the other bird, however, although no trypanosomes could be detected microscopically, yet the blood proved infective for mice for about a month ; this bird carried a chronic infection with *Plasmodium gallinaceum*.

Attention is drawn to the irregular results obtained by other investigators as to the susceptibility of fowls to *T. rhodesiense*, and it is suggested that perhaps a factor depressing resistance is required before infection can occur.—U. F. R.

DE KOCK, G., ROBINSON, E. M., & PARKIN, B. S. (1939). **Some Observations on Dourine.**—*J. S. Afr. vet. med. Ass.* **10.** 45-55. 1 table. [6 refs.]

As a result of the collection of a batch of about 50 infected mares at Onderstepoort it was possible to carry out a number of observations on the disease. Some of these mares remained in good condition over a period of four years and reacted strongly to the complement-fixation test over that period and were able to infect two stallions placed in contact with them. One of these stallions infected three out of five mares which he served. It was found that foals of reacting mares were negative reactors at birth, but became positive within 24 hours as a result of the ingestion of the colostral milk. The reaction was usually lost at about two to three months of age. In some cases from the field foals were encountered which reacted at seven months to a year and did not lose their reactions subsequently. These foals were probably actually infected.

Donkeys were found to give non-specific reactions to the complement-fixation test in a few cases.

In natural cases of dourine, therapy did not influence the reaction to the complement-fixation test.—E. M. ROBINSON.

POINDEXTER, H. A. (1939). **Relationship of Mononuclear Response to Resistance in Experimental Trypanosomiasis.**—*Amer. J. Hyg.* Sect. C. **29.** 111-114. 2 tables. [7 refs.]

A comparison of differential blood counts between adult and young rats infected with *Tryp. equiperdum* reveals that young rats have a more flexible mononuclear response to stimulation than adults, and both groups exhibit a marked increase in large lymphocytes. P. carried out experiments which showed that the chief factor responsible for death in infected animals was metabolic products in the serum. A temperature above 41°C. killed or rendered *Tryp. equiperdum* avirulent *in vitro* or *in vivo* within 20-30 minutes. From differential blood counts of pigeons (normal temperature 41°C.) before and after inoculation with *Tryp. equiperdum* P. presumes that all the parasites introduced into pigeons died within eight days.—M. L. BINGHAM.

NICOLLE, P., & SIMONS, H. (1939). La vitesse de sédimentation des hématies dans les trypanosomiases expérimentales du cobaye. [**Red Blood Corpuscle Sedimentation Rate in Experimental Trypanosomiasis in G. Pigs**].—*Bull. Soc. Path. exot.* **32.** 94-103. [9 refs.]

Three series of g. pigs were inoculated with *Tryp. equiperdum*, *Tryp. brucei*, and *Tryp. evansi*, respectively. Differential blood counts were made, the spleens were weighed, and observations on sedimentation were made after one, two, six and 24 hours. In all cases the sedimentation rate was markedly increased. The rate bore no constant relation to the period of infection, number of parasites in the blood, degree of anaemia or intensity of other blood changes, but there was some relation between the increased weight of the spleen in proportion to the body weight, and the acceleration of sedimentation.—M. L. BINGHAM.

POU, M. C., VIERA, O., CALZADA, V., & GARCÍA, J. A. R. (1938). Observaciones sobre coccidiosis de los animales domésticos en el Uruguay. [**Coccidiosis of Domestic Animals in Uruguay**].—*An. Fac. Vet., Montevideo.* No. 4. pp. 375-382. 9 figs.

Five cases of coccidiosis in sheep, three in dogs and a case in a cat are described. In the case of the sheep the oocysts found lacked both micropyle and residual body and measured 20-26μ by 13·3-16·6μ. Hence it is concluded that the parasite was not *Eimeria faurei* but another species hitherto not described in sheep.

The oocysts found in the dogs and cat were diplospores resembling *Diplospora bigemina*, except in one dog, when their dimensions appreciably exceeded those of *Dipl. bigemina.*

There are nine excellent photomicrographs.—E. MARTIN.

KIKUTH, W. (1937). Endotheliale Schizogonie bei Hühnermalaria (Pl. gallinaceum, E. Brumpt 1935). [**Endothelial Schizogony in Avian Malaria** (*Plasmodium gallinaceum*)].—*Zbl. Bakt. I.* (*Orig.*). **140.** *227-*230.

Pl. gallinaceum was transmitted to series of fowls either by direct blood inoculation, by fly bites or by injection with sporozoites. The infection was carried over seven passages and in seven out of 27 birds endothelial unpigmented schizogony forms were found, such as were described by JAMES and TATE [*V. B.* **9.** 840]. These forms could be found in nearly all the organs and always in the brain.—SASSENHOFF (MUNICH).

I. SERGENT, Ed., DONATIEN, A., PARROT, L., LESTOQUARD, F., & DELPY, L. (1939). Parenté des theilérioses bovines iranienne et algérienne démontrée par l'épreuve des prémunitions croisées. [**Relationship between Iranian and Algerian Bovine** *Theileria* **Shown by Cross-Immunity Tests**].—*Arch. Inst. Pasteur Algér.* **17.** 301-319. 15 figs. [2 refs.]

II. SERGENT, Ed., DONATIEN, A., PARROT, L., LESTOQUARD, F., & DELPY, L. (1939). Prémunition antitheilérique conférée par inoculation de sang de vertébré infecté ou par pique de tiques infectées. [**Immunization against Theileria Infection by Inoculation of Infected Blood or by the Bites of Infected Ticks**].—*Ibid.* 320-321. 1 chart.

I. The Iranian strain of theileria was obtained by allowing nymphs of a species of *Hyalomma* to feed on infected calves in Iran and then sending them to Algiers where, after moulting to adults, they were allowed to feed on clean calves. Cross-immunity tests were carried out by inoculating calves which had recovered from this infection with the Iranian and Algerian strains of *Theileria.* Calves recovered from the Algerian strain were also inoculated with the homologous and

heterologous parasites, and in both experiments the reactions were compared with those produced in clean control calves. In a limited number of experiments tick transmission was used as the method of infection in place of the inoculation of infected blood.

The severity of the reaction was judged by the temperature response and by the percentage of red corpuscles invaded by the parasites. " Crisigrammes " were constructed for each group of calves, forming charts in which the position of each calf was based on the number of degrees centigrade which its temperature had risen above normal and on the maximum parasite invasion of its red blood corpuscles ; the figure formed by joining the positions of the various calves in the group was taken as giving an indication of the severity of the reaction of the group. The reactions occurring in the clean control calves were in all cases more severe. In the recovered animals reactions were mild and often inappreciable, but though occasional animals gave a distinct reaction to the homologous strain a greater number of reactions was given to the heterologous strain. It is concluded that the Iranian *Theileria* is a strain of *Th. dispar* [*Th. annulata*], and that, since the various strains of this organism will give protection against each other, a mild strain can be used to immunize against a virulent strain.

II. The second article points out that in these investigations, when the original infection was produced by the bites of infected ticks the immunity acquired was greater than that conferred by an infection caused by the inoculation of blood.

—U. F. RICHARDSON.

BEAUMONT, E. (1939). **East Coast Fever of Cattle.**—*Vet. Rec.* **51.** 1311-1312.

B. records the finding of theilerial parasites in blood films, and blue bodies in spleen smears from a dead eland. The area concerned was believed to be free from East Coast fever, but four months later the disease broke out in cattle on the farm on which the dead eland was found. It is hoped to carry out transmission experiments to ascertain whether certain species of game may contract East Coast fever.—U. F. RICHARDSON.

REES, C. W., & UNDERWOOD, P. C. (1939). **Comparative Counts of Infected and Noninfected Erythrocytes in Bovine Anaplasmosis.**—*Proc. helminth. Soc. Wash.* **6.** 48-50. 1 table.

These experiments were designed to ascertain whether erythrocytes become infected in some special part of the circulatory system and to discover a method of detecting infection in carriers. Comparative counts were made of anaplasms occurring in the peripheral blood and in blood from bone marrow, liver, spleen and lungs. The material was obtained from fatal cases P.M., from carriers and from others in clinical stages or in the incubation period. During the incubation period no anaplasms were seen. In the clinical stages, anaplasms were no more plentiful in bone-marrow, liver, spleen and lungs than in peripheral blood. Bodies resembling anaplasms were found in the blood of carriers and in one case were quite plentiful in blood from the lungs. No definite focus of infection was found.

—S. J. GILBERT.

GRINBERG, K. (1939). **A Note on *Anaplasma* and on *Bartonella sturmani* sp. nov. in the Buffalo.**—*Ann. trop. Med. Parasit.* **33.** 31-36. 3 tables. [2 refs.]

Three young buffaloes were received from a tick-infested area in Palestine, and blood examination for a period of 12 days showed no abnormality. The animals were splenectomized and on the day following the operation anaplasms

were observed in one of them. It is considered that this was due to an incipient and not a latent infection. The anaplasms were observed for some 30 days. A splenectomized calf and a normal calf were each inoculated with blood from this buffalo. The former showed anaplasms after nine days and the latter after 12 days. *Bartonella* was found in the blood of one of the buffaloes and was similar in appearance to *Bartonella bovis* [(1934). DONATIEN and LESTOQUARD (*V. B.* **5.** 128.)] and *Bartonella muris*. More than 90% of the cells became infected with from 1-15 parasites per infected cell. One of the other splenectomized buffaloes was inoculated and became infected; a calf inoculated from this animal remained uninfected. The name *Bartonella sturmani* is proposed for the parasite.—S. J. G.

HEPDING, L. (1939). Ueber Toxoplasmen (Toxoplasma gallinarum n. sp.) in der Retina eines Huhnes und über deren Beziehung zur Hühnerlähmung. [*Toxoplasma gallinarum* **n. sp. in the Retina of the Fowl and its Connexion with Fowl Paralysis**].—*Z. Infektkr. Haustiere.* **55.** 109-116. [14 refs.]

In the course of an investigation as to the reliability of ocular lesions in the diagnosis of fowl paralysis, a hen was encountered in which the right iris showed a yellow-orange discoloration whilst the left iris showed a white ring round the pupil. In both eyes the pupil was distorted. The bird was emaciated but did not show symptoms of paralysis. Autopsy revealed a yellow discoloration of the optic nerve, which also showed areas of necrosis.

Microscopically some round-celled infiltration was detected in the ischiatic plexus, the brain and optic nerve. There was round-celled infiltration of various structures in the eyes; this was most marked in the optic nerve and retina, and the last also contained areas of necrosis.

Extra-cellular organisms resembling toxoplasms were detected in the retina in the ganglion cell layer, the plexiform and granular layers and in the layer of rods and cones. The commonest form was a pale staining body about $9{\cdot}8\mu$ in diameter, containing numerous granules showing nuclear staining affinities. These bodies appeared to break up into individual organisms about $3{\cdot}3 \times 1{\cdot}6\mu$, which were found in great numbers at the edges of the necrotic foci. Single organisms possessed a nucleus, and were rounded at one end and pointed at the other. Other multinucleate forms were encountered and interpreted as schizonts. There appeared to be no collection of round cells in the neighbourhood of the toxoplasms.

It is pointed out that toxoplasms have not previously been recorded in fowls, and attempts to infect them with organisms from other animals have failed. In view of this, and the fact that the organism is smaller than *Toxoplasma avium* of sparrows and other birds, but bigger than *T. canis*, it is considered to be a new species and given the name of *T. gallinarum*.

Particular attention is, however, drawn to the opinions of NICOLAU and BALAMUS [(1933 & 1934). *C. R. Soc. Biol. Paris.* **113.** 1002. and **115.** 959.] and DERS and KOPCIOWSKA [(1935). *Ibid.* **119.** 976.] that toxoplasms are not host specific, and that probably all belong to a single species.

It is suggested that this toxoplasm is not the causal organism of fowl paralysis, but is probably a secondary invader of a diseased eye.—U. F. RICHARDSON.

HIRATO, K. (1939). **Notes on Two Cases of Toxoplasmosis Observed among Raccoon-Dogs in the Vicinity of Sapporo.**—*Jap. J. vet. Sci.* **1.** 544-552. 22 figs. on 6 plates. [16 refs.] [In Japanese: Abst. from English summary].

H. describes two fatal cases of toxoplasmosis in emaciated raccoon-dogs affected with dysentery, and dyspnoea. There was enlargement of the spleen and liver and congestion and hepatization of the lungs and there were miliary necrotic

spots throughout the liver and lungs. Histological examination revealed bronchopneumonia, focal necrosis of the lungs and liver and an increase of fibrous tissue in the spleen. Schizont-like forms of *Toxoplasma* were present within the cytoplasm of epithelial, endothelial and interstitial cells of the lungs and pleura and within Kupffer's and liver cells. Parasites were also found in the reticulum cells of the spleen, epithelial cells of the small intestine and epithelial and interstitial cells of the kidney.—C. V. Watkins.

Donatien, A., & Lestoquard, F. (1939). La conjunctivite rickettsienne des ruminants. [**Rickettsial Conjunctivitis of Ruminants**].—*Rev. Méd. vét., Toulouse.* **91.** 361-376. 6 figs.

Although rickettsial conjunctivitis attacks sheep, goats and cattle, it is more common in the small ruminants which crowd close together. The parasites invade the epithelial cells of the conjunctiva and appear first as large cytoplastic inclusion bodies (initial bodies) staining red with Giemsa-May-Grünwald. These bodies become granular and break up into elementary bodies staining a lilac-blue. The conjunctiva is invaded by polymorphonuclear leucocytes.

By examination of lambs from an infected flock, it was found that initial bodies might be present in the conjunctival epithelium within 24 hours of birth, and that all lambs showed infection by the third day of life. The infection might be severe or mild depending to some extent on the activity of the disease in the mother. An inflammation of the conjunctiva appeared with the development of the initial bodies and reached its height with the appearance of the elementary bodies. In some cases development did not proceed beyond the stage of the initial bodies. The duration of acute disease varied, but after about a month granulations appeared on the mucous membrane of the eyelids and particularly on the nictitating membrane. These granulations were small translucent grains about 1 mm. in length, but they might be grouped together to form small elevations which, in the early stages, were reddish. It appears that it is in these granulations that the rickettsiae survive, and that infection persists for long periods, perhaps for life.

Nasal discharge of infected ewes contains rickettsial bodies, and it is suggested that lambs become infected at birth when their mothers lick them. It appears, however, that infection may be wind borne, as one case came under observation in which cattle, separated from infected sheep by a low wall, developed the disease. Sheep which have made an apparent recovery may be reinfected, but attacks tend to become milder with each reinfection and some animals finally appear to become resistant.

Treatment of lambs is not considered practicable, and no specific remedy is known. Zinc sulphate eye lotions are recommended for working cattle.—U. F. R.

Frenkiel, N. (1936). Recherches sur la fréquence du Balantidium coli Malmsten. chez les porcs des Abattoirs de Lausanne en relation avec la possibilité d'infection de l'homme. [**Incidence of *Balantidium coli* in Swine in Lausanne Abattoirs and Possibility of Human Infection**].—*Thesis méd., Lausanne.* pp. 39. [Numerous refs.]

By microscopic examination of fresh specimens of ingesta from the large intestine and caecum of 200 swine killed in the Lausanne abattoirs, infection with *Bal. coli* was demonstrated in 42·5% of the animals. On one farm an infection rate of 66% was detected by examination of faeces. Of the 200 abattoir animals, 47% were infected with *Trichomonas suis*, but only 6·5% with *Ascaris suum* and only 1·5% with coccidia. Whilst most examinations were carried out on fresh material, it was found that cysts of *Bal. coli* could be recognized after preservation

in 1% formalin. Attempts to stain the parasites were not very satisfactory, the best results being obtained with Gram-eosine or with fuchsin. No evidence was obtained that the balantidia were pathogenic to swine. The faeces of a limited number of tripe workers were also examined, but no infection was detected.

A description is given of the morphology of *Bal. coli*, its method of reproduction, natural habitat, cultivation and pathogenic action in man, but these sections of the thesis contain nothing original. It is pointed out that 200 cases of human balantidiasis had been recorded throughout the world up to 1913, and that since then cases have been recorded from Germany, the Balkan peninsula, Russia, France, Italy, India, China, North Africa, the Philippines, Brazil and Cuba. It has been considered that human infection is derived from swine, as most cases have occurred in tripe workers, pig farmers, butchers and other workers who are associated with these animals. It has been shown that balantidium infection is favoured by a diet rich in carbohydrates and an acid condition of the intestinal ingesta. It is pointed out that, in spite of the large percentage of swine found infected in Switzerland, no human cases have ever been recorded, and it is suggested that conditions in Switzerland must be unsuitable for human infection.—U. F. R.

CHABAUD, A. (1939). Infection de l'embryon de poule par *Spirochaeta duttoni* et *Spirochaeta ictero-hemorrhagiae*. [**Infection of the Fowl Embryo with** *Treponema duttoni* **and** *Leptospira icterohaemorrhagiae*].—*Bull. Soc. Path. exot.* **32.** 483-485. [1 ref.]

C. shows that *T. duttoni* and *L. icterohaemorrhagiae* are able to grow in chick embryos. *T.d.* appeared after the 86th hour of incubation and was found in enormous numbers at the fifth day. *L.i.* was not seen till the fifth day and then only in small numbers. Both spirochaetes killed the embryos, and it is interesting to note that chicks are resistant to these organisms although they infect and kill the embryos so readily.—A. L. WILSON.

DISEASES CAUSED BY VIRUSES

DOERR, R., & HALLAUER, C. (1939). Handbuch der Virusforschung. Zweite Hälfte. [**Text-Book on Viruses. Part II**]. pp. xvi+547-1384. 19 figs., numerous tables. [Numerous refs.] Vienna: Julius Springer. [4to].

This is the second half of the work, Part I of which was reviewed in *V. B.* **9.** 512. The layout of the material is the same in both parts. Part II contains articles on viruses as infective agents, on viruses as antigens, on acquired immunity against virus infections and on the principles of plant virus research.—J. E.

ROEMMELE, O. (1938). Der Einfluss des Klimas, der Haltung und Fütterung auf den Infektionsablauf der Maul- und Klauenseuche. [**Influence of Climate, Management and Feeding on Foot and Mouth Disease**].—*Dtsch. tierärztl. Wschr.* **46.** 470-471. [1 ref.]

Experiments on g. pigs have shown that warmth and the presence of much moisture in the air will shorten the incubation period of F. & M. disease and favour a severe attack. Cold and dry conditions increase the incubation period and favour a mild but protracted attack. Serum is more effective when the incubation period is short, and it is suggested that animals which are being actively immunized by the simultaneous method should be kept in a warm shed.

Experimental and field observations are quoted to show that lesions tend to develop where mechanical friction is great. For this reason the importance of soft food, soft, dry litter and rest during the incubation period is stressed. The

effectiveness of serum is considered to be dependent upon the attention paid to these hygienic measures.—A. T. Phillipson.

Curasson, & Philippe. (1939). Dessication du virus pestique en presence de phosphates tampons en vue de sa conservation. [**Desiccation of Rinderpest Virus and its Preservation in the Presence of Buffer Phosphates**].—*Bull. Serv. zootech. Epiz. A.O.F.* **11.** No. 8. 1-8. [4 refs.]

In an attempt to find a method for conserving rinderpest virus in a convenient form, the authors developed the method used by Laigret and Durand [*V. B.* **8.** 378], for the preparation of yellow-fever vaccine. Virulent spleen was crushed and suspended in a phosphate mixture (disodium-hydrogen-phosphate 100 g., potassium-dihydrogen phosphate 15 g.) in the proportion of one part of spleen to five parts of the salts. The mixture was dried at a low temperature, *in vacuo*, over anhydrous calcium chloride, the apparatus being protected from light. Drying was complete in about half-an-hour. The dried product was placed in ampoules, which were evacuated, sealed, and stored on ice. Tests (with saline suspensions of the powder) indicated that the product was still fully virulent 8, 22 and 45 days after preparation. Further trials were to be made.—H. E. Harbour.

I. van Saceghem, R., & Caccavella. (1939). Vaccination contre la peste bovine avec le parenchyme testiculaire formolé. [**Vaccination against Rinderpest with Formolized Testicular Tissue**]. *Bull. Soc. Path. exot.* **32.** 701-703. [4 refs.].

II. le Roux, G., & Tran Ngoc Hoan. (1939). Le thymus des veaux atteints de peste bovine expérimentale doit-il être compris parmi les organes à pouvoir immunigène élevé ? [**The Rinderpest Immunizing Value of the Thymus of Affected Calves**].—*Ibid.* 731-735. [1 ref.]

I. Two separate preparations of formolized testicular pulp from affected bovines were administered to two groups of ten bovines. On identical lines two separate preparations of spleen, lung, and lymph nodes from the same donors were administered to two control groups. All 40 subjects were tested 15 days later by the inoculation of 1 c.c. of virulent blood. Of the total of 20 test subjects, 15 died of rinderpest. All but one of the 20 controls resisted the inoculation.

It is concluded that testicular preparations have little value.

II. In a small series of experiments, vaccines prepared from the thymus of affected calves were found to possess little antigenic value, as compared with lymph node preparations, and insufficient to justify the inclusion of the thymus in the material used for vaccines.—E. O. Longley.

le Roux, G. (1939). Effet de l'enrobement dans la lanoline sur l'activité du vaccin contre la peste bovine. [**Effect on Rinderpest Virus of Coating in Lanolin for the Preparation of Rinderpest Vaccine**].—*Bull. Acad. vét. Fr.* **12.** 125-128. 3 tables.

The vaccine ordinarily prepared at Nhatrang consists of spleen, lungs and lymph nodes pulped and mixed with formol glycerin. This vaccine was compared with a similar preparation first suspended in lanolin and then diluted with liquid paraffin. A third vaccine was treated with glycerin and added to lanolin and liquid paraffin. The ordinary vaccine was injected into five calves, and each of the other two into four calves. The inoculations were made in different situations in amounts of 2 c.c. at each point, in varying total doses. The second vaccine conferred four times as strong an immunity as the first and eight times as strong as the third.

In various tests, the addition of lanolin gave constant results for the same doses of vaccine and appeared to produce the maximum development of the immunizing power of the pulp used.—S. J. GILBERT.

TODOROFF, A. (1939). La transmission de la peste porcine par les poux. (Note préliminaire). [**Transmission of Swine Fever by Lice**].—*Bull. Off. internat. Epiz.* **18.** 210-212.

An account of experiments planned to determine the part played by lice in the transmission of swine fever, but not carried out.—J. R. LAWSON.

I. ISHII, S. (1939). **On the Histopathological Studies of Infectious Anaemia in the Horse. III. Observations on Tissue-Iron and Siderocytes.** *Jap. J. vet. Sci.* **1.** 211-237. 12 figs. on 3 plates, 10 tables. [Numerous refs.] [In Japanese: abst from English summary]. [For parts I and II, see *V. B.* **9.** 239].

II. ISHII, S., NAKAMURA, N., & NOMUTO, K. (1939). **Studies on the Histo-Pathological Changes in the Horse Suffering from Infectious Anaemia. IV. Several Observations on the Ovary.**—*Ibid.* 315-330. 8 figs. on 3 plates, 2 tables. [15 refs.] [In Japanese: abst. from English summary].

I. The activity of cells of the reticulo-endothelial system, with special reference to their iron content, was studied in 32 horses inoculated with the virus of E.I.A. and in six normal controls. In the early stage of the infection there was marked hyperplasia of the R.E. cells which were filled with small iron-containing pigment granules. Similar cells were also demonstrated in smears of blood from the renal and portal vein. It appears that in later stages of the disease the cells are transported to the liver where they are responsible for the characteristic siderosis described in E.I.A. Siderosis is also seen in the lymph nodes, kidneys and lungs.

II. Chronic inflammatory changes are described in the vessels of the cortical region of the ovary in mares with E.I.A. (naturally and artificially infected). There is hyaline degeneration of the vessel wall followed by proliferative changes in the intima in the form of nodules composed of large and small mononuclear cells. Similar vascular changes may be found in other organs, and are said to enable the disease to be diagnosed by the failure to respond to atropine administration by a rise in blood pressure.—E. G. WHITE.

I. OSWALD, B. (1934). Nekoliko opažanja o uspesima i neuspesima današnje naše humane antirabične vakcine. [**Some Observations on the Value of the Present Human Antirabies Vaccine (in Yugoslavia)**].—*Jugoslov. vet. Glasn.* **14.** 664-665.

II. ARANICKI, M. (1935). O efikasnosti naše humane antirabične vakcine kod vučjih ozleda i nojihovih granica. [**On the Limits of Efficacy of the Present Human Antirabies Vaccine**].—*Ibid.* **15.** 322-331. 6 tables.

III. MARKOVIĆ, D. (1936). Štete od vukova. [**Damage Caused by Wolves (in Yugoslavia)**].—*Ibid.* **16.** 578-583. 1 fig., 1 table.

IV. MARKOVIĆ, D. (1938). Problem besnila. [**Problem of Rabies (in Yugoslavia)**].—*Ibid.* **18.** 495-500.

V. JEŽIĆ, J., & KOBRNJA, E. (1937). Postinfekcionalna cijepljenja životinja protiv bjesnoće neoslabljenim virus-fixe-om. [**Antirabies Vaccination in Yugoslavia with the Non-Attenuated Fixed Virus of Animals bitten by Rabid Animals**].—*Arhiv Minist. Poljoprive., Belgrade.* **4.** No. 7. 48-81. 10 tables. [French summary].

VI. KENDA, I. (1937). Pokušaj suzbijanja besnila preventivnim cepljenjem

pasa fenolizovanom eter-vakcinom. [**An Attempt to Control Rabies in Yugoslavia by Preventive Vaccination of Dogs with a Phenol-Ether Vaccine**].—*Ibid.* 118-125. 1 table, 1 diagram. [German summary].

VII. KODRNJA, E. (1938). Kritika publikacije g. dra. Kende " Pokušaj suzbijanja besnila preventivnim cepljenjem pasa fenolizovanom eter-vakcinom ". [**Criticism of Kenda's Article Entitled " An Attempt to Control Rabies by Preventive Vaccination of Dogs with Phenol-Ether Vaccine "**].—*Jugoslov. vet. Glasn.* **18.** 30-32. 1 diagram. [See VI, above].

VIII. KENDA, I. (1937). Prinos poznavanju virulence uličnog virusa besnila u nekim krajevima Jugoslavije. [**On the Virulence of the Street Rabies Virus Observed in Certain Regions of Yugoslavia**].—*Arhiv. Minist. Poljopriv., Belgrade.* **4.** No. 7. 83-91. 6 tables. [12 refs.] [German summary].

IX. KODRNJA, E. (1939). Problem bjesnoće u Jugoslaviji i potreba dopune veterinarsko-redarstvenih mjera antirabičnim cijepljenjima. [**Problem of Rabies in Yugoslavia : Need of Completion of Veterinary Policy Measures by Antirabies Vaccination**].—*Jugoslov. vet. Glasn.* **19.** 51-74. 1 table, 3 diagrams, 2 maps. [German summary].

I. An account of O.'s experience of rabies in human beings who were bitten by rabid animals, mostly dogs, in Southern Serbia in the years 1932-1934. One human being was bitten by an unweaned pig in which the presence of rabies was confirmed microscopically. All the infected persons were subjected to antirabies treatment, according to the method of HEMPT [see II below].

Five men were bitten by two rabid wolves and all died after incubation periods of from 16-27 days, in spite of submission to the above treatment.

O. suggests that rabies virus in wolves in Yugoslavia is of high virulence, and that the period of incubation is consequently shorter than is commonly the case in rabies. The ordinary antirabies treatment does not act quickly enough to counteract infection from wolf bites. The desirability is discussed of a stock antirabies serum.

II. A., who is employed in the preparation of Hempt's antirabies vaccine at the Institute of Hygiene, Novi Sad, criticises OSWALD's suggestion [see I, above] concerning wolf bites, and holds the opinion that the standard treatment, which is described, is sufficient for all cases of rabies in human beings. Between 1928 and 1933, 152 cases were treated of rabies transmitted by wolves, and the mortality was 11 cases (7·23 %). Attempts to make an antirabies serum have been uniformly unsuccessful both in Yugoslavia and elsewhere.

III. Southern Yugoslavia, especially southern Serbia, harbours a considerable number of wild animals, such as wolves, bears, jackals and foxes, which are responsible for heavy losses in domestic animals, chiefly through their predatory habits.

Wolves are very dangerous for both man and animals as carriers of a highly virulent rabies virus [see VIII, below], characterized by a very short period of incubation, and a certain mortality, in spite of antirabies treatment [see I above]. Successful antirabies treatment in man is obtained only in cases where the incubation period is above 30 days [see I, above]. Wolves should be systematically eradicated in Yugoslavia ; there are about 10,000 wolves in southern Serbia alone.

IV. M. gives a short review of the present position concerning rabies in other countries in Europe, and states that in Yugoslavia, in spite of a modern Animal Contagious Diseases Control Act, the number of cases of rabies in both man and animals has been increasing from year to year ; this is said to be partly because of the disobedience of dog-owners. He emphasizes the need for rigorous control measures.

V. Antirabies vaccines for use on animals are prepared at the Veterinary Experimental Station, Zagreb, Yugoslavia. Two vaccines are made, a live fixed-virus vaccine and a heat-killed fixed virus vaccine.

The treatment of cattle and horses which have been bitten consists of one dose of the dead vaccine followed by two doses of the live vaccine. Sheep, goats and swine are given two doses of the live vaccine only. [Post-infection treatment of dogs and cats is forbidden in Yugoslavia. The exact details of the preparation of the above vaccines are not given]. Records are provided of 1,079 farm animals treated with these vaccines. In 191 cases the existence of rabies was verified, and in ten of these cases rabies developed in spite of vaccination, *viz*, in five cows, four pigs and one goat. In all these animals except in one cow, the incubation period was less than three weeks. The vaccine was not efficacious because of the short incubation period, as at least three weeks are required for the development of immunity.

VI. During the period 1927-1936, 141 cases of rabies were recorded in human beings in Yugoslavia. A phenol-ether vaccine (*i.e.* killed virus) is prepared for veterinary purposes at the Institute of Hygiene, Novi Sad. 1,025 dogs were given prophylactic vaccination at Stanišić (northern Yugoslavia), and for 18 months no case of rabies occurred among them, while one case took place in a non-vaccinated dog. To test the value of the vaccine, ten dogs, which had been vaccinated seven months before at Stanišić, were put into a large pen, together with five dogs, which had been inoculated subcutaneously with rabies virus, and with five more dogs, which were neither vaccinated nor infected. None of the dogs contracted rabies and the experiment was, therefore, a failure. This experiment was repeated twice more with the same vaccinated dogs, but with other infected dogs, always with negative results.

K. concludes that this vaccine is harmless and that it confers a strong immunity.

VII. The author considers that KENDA's experiments [see VI, above] cannot be taken as valid tests of the development of immunity by animals receiving the above vaccine. His opinion is that the negative results were due to the fact that Kenda used the wrong method for infection, *i.e.* the subcutaneous instead of the intracerebral method.

VIII. In 1921, ALIVISATOS drew attention to the occurrence in Serbia of a very potent rabies virus, which is characterized by a very short period of incubation (the so-called " virus renforcé "); natural periods of incubation, as short as one week only, were repeatedly observed in dogs in Serbia. OSWALD, in 1934, made similar records of fatal cases in human beings following wolf bites, even in spite of an early antirabies treatment [see I, above], and MARKOVIĆ gave similar reports from southern Serbia in 1936 [see III and IV, above].

K. made a series of investigations in order to find out whether an unusually virulent virus does exist in Serbia. Emulsions were prepared from brains obtained from rabid dogs and other animals from northern and eastern Yugoslavia, and inoculated subcutaneously into white rats. More than half of the rats developed rabies within a period of less than four weeks; this is taken as evidence that the virus in question was the " virus renforcé " referred to above.

IX. The author opens with a review of the problem and of the present state of antirabies vaccination, both in man and animals, throughout the world. He describes the present position in Yugoslavia where the incidence of rabies is higher than in Hungary and lower than in Bulgaria, Rumania or Poland.

Between 1919 and 1938, 482 cases of rabies in human beings had been reported. At present the incidence of human rabies is about 45 cases per year, and that of animal cases, about four per day.

Four kinds of antirabies vaccine are prepared in Yugoslavia—a live carbolized fixed virus vaccine, a dead carbolized fixed virus vaccine, a dead carbol-ether vaccine (Hempt's vaccine) and a lipo-vaccine.

Up to the present time 24,000 animals have been vaccinated against rabies in Yugoslavia, about one-third of these being dogs. Preventive vaccination of dogs has given good results with regard to the animals themselves, without reference to the rabies problem as a whole.

The author suggests that the following measures for the control of rabies in the country should be considered :– (i) that a Balkan Conference for the control of rabies be founded ; (ii) that the Government of Yugoslavia be urged to allow preventive vaccination of dogs ; (iii) that compulsory annual vaccination should be applied to all sheep dogs, police dogs and sporting dogs in infected areas ; (iv) that in heavily infected areas every dog should be vaccinated ; (v) that the post-infection treatment of all domestic animals except dogs and cats should be compulsory, and (vi) that the existing regulations under the Contagious Diseases of Animals Act should be made more strict and carried out firmly.

—B. Oswald (Križevci).

Remlinger, P., & Bailly, J. (1939). La vaccination antirabique des animaux au Maroc en 1938. **[Anti-Rabic Vaccination of Animals in Morocco in 1938].** —*Maroc méd.* **19.** 75-77. 4 tables. [1 ref.]

From 1928-38 the total number of animals vaccinated against rabies with the vaccine of the Pasteur Institut of Tangier was 13,766. In 1938 alone the number was 1,985.

This vaccine was originally etherized, but, as it proved capable of storage for only 12 days at most, it was decided to use instead a phenolized vaccine, identical in method of application and effect to the other, but with the advantage of keeping for at least three months. Generally speaking, the dose for ruminants was larger than that for solipeds. There were no cases of paralysis or other unusual reaction.

The susceptibility of the cat to phenol is emphasized. About 30 minutes after subcutaneous injection into the flank or abdomen of the usual initial dose of 40 c.c. of vaccine cats showed marked signs of illness and death followed within two days ; acute hepatitis and nephritis were observed P.M. Upon inoculation with 20 c.c. of 1% phenol, cats showed signs of disorder for several days, but finally recovered. An injection of 10 c.c. caused no ill effects. It was decided, therefore, to administer the vaccine to cats in four doses of 10 c.c. each at intervals of 24 hours.

28 solipeds and bovines were inoculated after receiving bites and none of them developed rabies.

Manninger, R. (1938). Die Schutzimpfung der Hunde im Dienste der Tollwutbekämpfung. **[The Vaccination of Dogs in Rabies Control].**—*Acta Conv. tert. trop. malar. Morbis, 1938.* Pt. I. pp. 583-589. Amsterdam : Societias Neerlandica Medicinae Tropicae. [In German].

After a discussion on the various types of vaccination which have been used in different countries, M. gives some details of preventive vaccination of dogs in Hungary.

Vaccination was first begun in 1929. It was on a voluntary basis, was very limited in extent and had practically no influence on the incidence of rabies in the country. In 1933 a beginning was made to introduce compulsory vaccination of all dogs in a limited area comprising one government district ; the results were favourable. In 1934, annual vaccination was made compulsory for all shepherds'

dogs in Hungary, which numbered about 32,000. In 1936 compulsory vaccination was extended to all dogs in the western part of Hungary and included about one-third of the country, and whereas in 1934, 153 cases of rabies in dogs had been diagnosed, in 1938 only three cases were notified.

M. states that in 1937, 384,463 dogs were vaccinated and that rabies developed in only one of them, a dog which showed symptoms of rabies four days after vaccination, *i.e.* almost certainly from infection contracted before vaccination.

Other rabies control measures in Hungary include the destruction of ownerless dogs and of dogs for which the owners have not paid the tax. M. states that it is intended to introduce compulsory vaccination of dogs throughout the whole of Hungary.

With regard to the assessment of results of large scale vaccination, M. points out that it is difficult to arrive at any significant conclusion, owing to the many uncontrollable influences in operation, chiefly represented by the lack of adequate control. The difficulties present in any country which has no effective frontier barriers to infection from neighbouring States are also emphasized.—J. E.

GREEN, R. G. (1939). **Changes in the Virulence of Distemper Virus on Fur Animal Ranches.**—*Amer. Fur Breed.* **12.** No. 5. 12-13. 1 photograph. [Reprint appeared in *Skand. Vet Tidskr.* **29.** 1227-1231. (1939). (In English: Swedish summary)].

Under natural conditions a normal distemper virus is capable of producing infection in dogs, foxes, mink, ferrets and other allied species. The herding together of many animals of the same species under artificial conditions produces a rapid modification of the virus. Thus, a distemper infection will spread rapidly through a herd of foxes, but no disease will be observed in mink living on the same farm. This modification gives rise to a variation in the symptoms of the disease in the early stages of the epizootic. In foxes no secretion from the eyes and nose is observed and no pneumonia is found on P.M. examination; distemper inclusion bodies, however, are found. As the infection progresses throughout the herd the symptoms become those of typical distemper. The distemper virus *per se* produces a severe infection in foxes and mink, and secondary bacterial infection is not of such importance as in the case of distemper in dogs. Modification of the virus by passage through different species of fur animals makes possible the production of avirulent viruses for vaccination purposes.—E. C. HULSE.

GREEN, R. G. (1939). **The Use of Modified Distemper Virus in the Immunization of Foxes.**—*Skand. Vet Tidskr.* **29.** 858-861. [In English: Swedish summary].

It has been found that passage of the dog distemper virus through ferrets lowers its virulence for foxes. In one preliminary test a virus passaged 54 times in ferrets was injected into 500 silver fox pups; none became visibly sick and none subsequently died of distemper. In all cases where this vaccine has been used either alone or with protective serum, immediate immunity has resulted.—R. F.

SALSBERY, C. E. (1939). **Infectious Gastroenteritis of Cats.**—*J. Amer. vet. med. Ass.* **95.** 195-200. [10 refs.]

Infectious gastro-enteritis of cats is a highly infectious and contagious disease characterized by depression, hyperpyrexia, cachexia, a short course, and a high mortality. The disease attacks primarily young cats up to eight to nine months old, although older cats are susceptible on occasion.

Initial cases in outbreaks are usually hyperacute and may be difficult to

diagnose, since death often intervenes before satisfactory observations can be made. Less acute cases, however, present typical symptoms and P.M. appearance [see *V. B.* **5.** 19].

The disease can be controlled by a vaccine prepared from the formalinized spleen tissue of clinical cases of the disease. Single injections of the preparation set up solid immunity. A serum-virus method of vaccination has also been evolved and has been used with success. The control of the disease on a wider scale, however, must necessarily await the production of an efficient heterologous antiserum.—D. D. Ogilvie.

Ridala, V. (1938). Sigade influentsa etioloogiast. [**Aetiology of Swine Influenza**].—*Eesti loomaarstl. Ring.* **14.** 277-287. [Numerous refs.] [English summary].

In experiments which R. carried out, repeated intranasal injection of Seitz EK filtrate of the lungs of a pig affected with swine influenza induced no clinical symptoms of the disease in piglets, nor were any macro- or microscopical pathological changes set up in the lungs. Similar injections of filter-paper lung filtrates did, however, cause a clinically and pathologically characteristic swine influenza in piglets, and *Haemophilus influenzae suis* was found in lesions in the lungs.

R. produced swine influenza in piglets by repeated intranasal injections of fresh strains of *H. influenzae suis*. The repeated intranasal inoculation of a stock strain of the organism cultivated for a long time caused only very slight changes in the apical lobes of the lungs. R. concludes that repeated sub-cultivation reduces the virulence of the organism. He considers that these experiments show that in Estonia *H. influenzae suis*, and not the filtrable virus, is the direct cause of swine influenza.—E. Ridala (Tartu).

Fairbrother, R. W., & Martin, A. E. (1939). **Further Observations on the Value of Heated Elementary Body Suspensions in Immunization Against Experimental Influenza.**—*Arch. ges. Virusforsch.* **1.** 114-119. 5 tables. [8 refs.] [In English]. [Authors' summary copied *verbatim*].

Further evidence has been obtained that E.B.S. heated at 57°C. for 30 minutes constitute a satisfactory immunizing agent. They produce a high degree of immunity in mice; they are sterile, non-infective and relatively stable. They are consequently very suitable for field experiments in man.

Troup, A. G., Adam, R., & Bedson, S. P. (1939). **An Outbreak of Psittacosis at the London Zoological Gardens.**—*Brit. med. J.* Jan. 14th. 51-55. 5 tables, 1 chart. [4 refs.]

The importation of a collection of parrots from South America and the West Indies led to five cases, including one death, amongst the attendants at London Zoological Gardens. The birds were isolated when they arrived as they were in poor condition; they improved and were removed from the sanatorium to the parrot house where they were kept in isolation from the other inmates.

When the attendants became ill an examination of the birds led to their destruction. The presence of virus was demonstrated in spleen smears from two of the birds which died or were ill; one was from the new consignment and one a contact in the sanatorium.

The clinical history of each of the five human cases is described in detail, results being given of blood cultures, blood counts and agglutination tests. The report of the P.M. examination of the fatal case is detailed.

The results of serological examination of those who had contact with the birds

showed the presence of complement-fixing antibodies in all except one. The attendant with the negative serological finding had been employed in the parrot house for 30 years with no history of a disease resembling psittacosis.

Virus, shown by mouse inoculation, was contained in the sputum of one of the affected attendants. Virus was obtained from the mixed spleen and lung from the fatal case. The histology of the spleen and lung of this case is described in detail. The virus was also obtained from two birds involved in the outbreak, one a macaw and the other a budgerigar.

The existing regulations of the Ministry of Health relating to psittacosis may have protected this country from wide-spread outbreaks but they do not prevent the possibility of the introduction of healthy carriers. The Zoological Society and the Ministry of Health have decided to impose a three months' quarantine period on all newly acquired parrots arriving at the Zoological Gardens. Rigorous sanitary measures have been drafted for the collection and the disposal of the birds' excreta.

For protection the attendants of suspected birds should wear gloves, masks, and goggles as the route of human infection is probably *via* the respiratory tract.

—L. E. Hughes.

Pearce, J. M. (1939). **Cardiac Lesions in Rabbits Produced by a Filtrable Virus (Virus III).**—*Arch. Path.* **28.** 827-845. 8 figs., 4 tables. [Numerous refs.] [Author's summary copied *verbatim*].

The intravenous, intratesticular or intranasal inoculation of virus III into rabbits resulted in the development of cardiac lesions in a small percentage of animals. These lesions consisted primarily of scattered areas of myocarditis containing the characteristic intranuclear inclusion bodies in inflammatory cells, fibroblasts and muscle cells. The lesions occasionally included also non-vegetative endocarditis and fibrinous pericarditis.

If inoculation was preceded by puncture of the heart with a needle or by intravenous administration of a large dose of a solution of acacia the incidence of myocarditis approached 100 per cent., the severity and extent of the lesions were greatly increased, and endocarditis and pericarditis were frequent findings. Pitressin injected intravenously had a similar but less marked effect.

The importance of these observations is twofold. They demonstrate that a virus entering the animal body by several routes may localize in the heart and there cause extensive damage and that this localization presumably is largely dependent on some transient deviation from the normal physiologic conditions of the heart and circulatory system or on some minor and transient change in nutritional or anatomic relationships. The possibility of a spontaneous virus III infection must be taken into account in the interpretation of experimental work dealing with cardiac disease in which the rabbit is used.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

Lewis, E. A. (1939). **The Ticks of East Africa. Pt. II. Tick-Borne Diseases and Their Control.**—*Emp. J. exp. Agric.* **7.** 299-304. 1 table. [6 refs.]

A review is given of tick-borne diseases, causal organisms, vectors, mode of transmission of the micro-organisms and their fate in the intermediate hosts. There are still many gaps to be filled in order to complete the information on the parasites and the role played by the vector ticks. Unfed larvae of *Rhipicephalus appendiculatus* will survive for at least 284 days, nymphae for 609 days and adults

for 1,013 days. *Theileria parva* in unfed nymphae and adults disappears when the ticks are kept for about 300 days, although in one case the parasite appeared to live for over 910 days. The longevity of *Rh. sanguineus* under laboratory conditions is 527 days, of *Rh. pulchellus* 417 days and over, of *Amblyomma gemma* 493 days and of *A. variegatum* 732 days. Methods of control are discussed. In East Africa, control involves all classes of domestic animals and in some districts a consideration of game, birds and vermin. Dipping is recommended because it strikes at the root of the evil by killing the potential source of all tick-borne diseases and prevents further reproduction of ticks. It has been shown that on well-fenced farms, dipping will eradicate ticks even in the midst of heavy tick-infested country. Data upon the intervals between immersions for each species of tick is given.

—W. Moore.

Bishopp, F. C., & Smith, C. N. (1938). **Combating the American Dog Tick, Carrier of Rocky Mountain Spotted Fever in the Central and Eastern States.** —*Publ. U.S. Dep. Agric., Bur. Ent.* No. E-454. pp. 5. 2 figs.

This paper gives a summary of the life-history of the American dog tick or common wood tick *Dermacentor variabilis* which is found in the Mississippi Valley and the Eastern States. It is a known carrier of Rocky Mountain spotted fever and is capable of carrying " rabbit fever " (tularaemia).

Suggested methods of control are :– (1). Prevent ticks engorging upon dogs by hand picking the ticks daily or washing the dog every fourth day with a derris dip. (2). Destroy all alternative hosts such as rats and mice by trapping and poisoning. (3). Keep underbrush, grass and weeds closely cut, burnt or grazed to remove protection favourable to the ticks. (4). Spray infested areas near dwellings or in parks with a solution consisting of one part of nicotine sulphate (40%), one part soap and 288 parts water. Ticks found attached to human beings should be removed immediately and the point of attachment cauterized with phenol or silver nitrate.—W. Moore.

Philip, C. B. (1939). **Ticks as Vectors of Animal Diseases.**—*Canad. Ent.* **71.** 55-65. 5 tables.

P. outlines the geographical distribution of ticks, their host adaptability and feeding habits—dealing with world-wide distribution. He speaks of the diseases caused by different categories of causal agents—spirochaetes, flagellates, sporozoa, rickettsia, bacteria and filtrable viruses. There are extensive tables showing the tick-borne diseases of the different animals and the ticks responsible for their spread.

—Thos. Moore.

Shillinger, J. E. (1938). **Deer in Relation to Fever Tick Eradication in Florida.** —*Trans. 3rd N. Amer. Conf., 1938.* pp. 882-885. Washington : American Wildlife Institute.

A tropical variety of the cattle fever tick (*Boophilus annulatus*) has recently been discovered in Florida. In addition to cattle this variety also attacks deer. The tick-fever eradication scheme, consisting chiefly of controlled cattle dipping, has proved ineffective in Florida. Herds of deer at free range constitute a reservoir of infection, and reinfection of dipped cattle occurs through the agency of the tick. No solution other than the complete temporary elimination of deer from Florida seems possible. A precedent was afforded by the slaughtering of over 22,000 deer from Stanislaus National Forest during the 1924 outbreak of F. & M. disease in California. In that instance the deer re-established themselves naturally by immigration in four to five years, in numbers comparable with the original population.—D. D. Ogilvie.

CLARK, R. (1938). **A Note on Paralysis in Lambs Caused Apparently by *Rhipicephalus evertsi*.**—*J. S. Afr. vet. med. Ass.* **9.** 143-145.

During the months of September to November 1937, several outbreaks of paralysis in lambs nine months to a year old were encountered in the Eastern Orange Free State. The lambs were infested with *R. evertsi* and on removal of the ticks recovery took place within two days. No ticks of the *Ixodes* type could be found. There was no mortality and only a few lambs were affected in each outbreak. The disease appeared and disappeared very suddenly generally following isolated showers after a drought period.—E. M. ROBINSON.

POSPELOVA-SHTROM, M. V. (1936). O rasprostranenii, ekologii i dinamike kleshcheĭ roda H., preimushchestvenno v predelakh S. S. S. R. [**Distribution and Ecology of *Haemaphysalis* Ticks in U.S.S.R.**]—*Patogen. zhivotn.* pp. 97-104. [Numerous refs.] Moscow: All-Union Inst. exp. Med. [German summary].

The author examined more than 12,000 specimens of *Haemaphysalis*; he described the geographical distribution, ecology, seasonal occurrence and host affinities of 11 *Haemaphysalis* species found in the U.S.S.R.—E. MARTIN.

SEN, P. (1938). **Role of Mosquitoes in the Transmission of Animal Diseases.**—*Agric. Live-Stk India.* **8.** 689-694. [13 refs.]

S. emphasized the need for further investigation into the role played by mosquitoes in the transmission of protozoan, virus and helminthic diseases of animals.—R. FISHER.

EICHLER, W. (1937). Einige Bemerkungen zur Ernährung und Eierlage der Mallophagen. [**Nutrition and Egg Deposition of Lice**].—*S.B. Ges. naturf. Fr. Berl.* March 16th. 80-111. 1 table. [Numerous refs.]

E. discussed the various materials utilized as food by lice, and the various sites of oviposition. Food materials include feathers and feather detritus, dust particles including organic matter and sand grains, skin débris, blood, lachrymal fluid, hair, etc. Eggs are laid on the under side of the feather vane, either on or inside the shaft or on hairs. Under each heading are given the names of the appropriate species. There is a systematic table of the Mallophaga.—A. L. WILSON.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

CHEN, H. T. (1936-1937). **Parasites in Slaughter Houses in Canton. Part I. Helminths of Kwangtung Hogs. Part II. Nematodes Parasitic in the Alimentary Tract of Buffaloes, with a Description of Two New Species. Part III. Trematodes and Cestodes Parasitic in the Alimentary Tract of Buffaloes.**—*Lingnan Sci. J.* **15.** 31-44; **16.** 157-165 and 585-590. 21 figs., 3 tables. [Numerous refs.] [In English: Chinese summary].

I. Pigs account for over 90% of the animals slaughtered for food in Canton. C. examined 100 alimentary tracts from pigs from various abattoirs, and found 19 species of helminths (13 nematodes, three trematodes, two cestodes, one acanthocephalan). Those of most frequent occurrence were *Cysticercus tenuicollis* (80-85%), *Ascaris lumbricoides* (40%), *Oesophagostomum longicaudum* (36%), *Arduenna* sp. (? *dentata*) (29%) and *Fasciolopsis buski* (26%). *Clonorchis sinensis* was recorded for the first time from pigs in China. *Paragonimus* and *Trichinella* were not found, although diaphragms of 1,000 hogs were examined for the latter.

II. Six species of nematodes were collected from buffaloes from various parts of China, including *Setaria leichungwingi* n.sp., *Cooperia laterouniformis* n. sp., *Trichuris ovis* and *Haemonchus* sp.

III. Only one cestode, *Moniezia benedeni*, was found; this occurred twice only. Trematodes found included *Fischoederius elongatus*, *Cotylophoron cotylophorum* (both very common in the stomach), *Paramphistomum orthocoelium*, *Eurytrema pancreaticum*, and *Fasciola hepatica* (fairly common in the liver and bile ducts).—E. S.

PETROV, A. M., & GAGARIN, V. G. (1937). Prizhiznennaya differentsial'naya diagnostika strongiloza, delafondioza, al'fortioza, triodontoforoza i trikhonematozov loshadeĭ. [**Differential Diagnosis of Infestation of Horses with** *Strongylus equinus*, *Str. vulgaris*, *Str. edentatus*, *Triodontophorus tenuicollis*, *Trichonema radiatum*, *Trich. pateratum* **and** *Trich. bicoronatum*]. —*Papers on Helminthology, commemorating 30 year Jubilee of K. I. Skryabin.* pp. 508-528. 14 figs., 3 tables. Moscow: Lenin Acad. Agric. Sci.

The authors state that in examining ova and first- and second-stage larvae of Strongylidae they were unable to find any specific characters permitting a differential diagnosis *intra vitam* of the diseases caused by the various genera and species of this family.

Only third-stage (infective) larvae serve as a means of diagnosis *intra vitam*. A table listing certain differential characters of the worms named in the title of the paper, is given.—E. MARTIN.

GORSHKOV, I. P. (1938). Vazhneishie glistnye bolezni svinei. [**The Principal Helminth Diseases of Swine**]. pp. 46. 13 figs. Moscow: Sel'khozgiz. [8vo].

A short outline for the use of the practising veterinarian.

The introductory section defines helminths, describes the mechanism of invasion and gives an appreciation of the economic losses and the danger to human health arising from helminth infestation of pigs.

A very brief survey of the principal helminth diseases, their diagnosis, therapy and prevention is followed by a section on the general principles of control.

Control measures are grouped under two headings :- (1) anthelmintic treatment of hosts (including dogs and human personnel), and (2) the hygiene of sties, runs and pastures. Under this heading G. also deals with safe manure management and stresses the responsibility of the veterinarian in this respect.

Emphasis is given to the necessity for co-operation with medical and sanitary authorities in order to discover and eliminate potential human sources of infestation of pigs, the importance of popular, enlightening lectures, and the careful supervision of staff conveniences.—E. MARTIN.

SCHULZ, R. E. S., & KAMINSKIĬ, F. O. (1937). Metastrongilidy svinei, ikh morfologiya i sistematika. [**Metastrongyles of Swine, their Morphology and Systematic Position**].—*Papers on Helminthology, commemorating 30 year Jubilee of Prof. K. I. Skryabin.* pp. 615-624. 25 figs. Moscow: Lenin Acad. Agric. Sci.

A detailed description is given of *M. elongatus*, *M. salmi* and *Choerostrongylus pudendotectus*, based on original observations and measurements of specimens collected from domestic swine in White Russia (Byelorussia) and from wild pigs (*Sus scrofa atilla*) in Azerbaijan.—E. MARTIN.

OHASI, M. (1939). **Experimental Studies on** *Cysticercus cellulosae*.—*Jap. J. vet. Sci.* **1.** 1-46. 4 figs. on one plate, numerous tables. [15 refs.] [In Japanese : abst. from English summary].

O. found that an emulsion of tissue containing *C. cellulosae*, when injected subcutaneously into rabbits and pigs, induced the formation of complement-fixing substances and precipitins. Serum from such animals reacted positively to antigens prepared from *Echinococcus*, *Taenia marginata*, *T. solium*, *Cysticercus tenuicollis* and sometimes *Dipylidium caninum*. Sera from healthy rabbits and pigs, or from pigs with an echinococcus infection in the viscera, reacted negatively with all these antigens.

An antigen prepared by boiling measly flesh gave a strongly positive complement-fixation reaction with serum from heavily infested pigs, and a positive reaction also in human cysticercosis patients and moderately infested pigs. Serum from infested pigs reacted positively with antigens from *Echinococcus*, *T. marginata* and *C. tenuicollis*, but negatively with antigens of *Ascaris lumbricoides*, *Fasciola hepatica*, and of serum, muscles and visceral organs of uninfested pigs. Serum from human patients reacted negatively with all antigens except *C. cellulosae*.

A positive precipitation test was obtained with serum of infested pigs and antigens of *Echinococcus*, *T. marginata*, *T. solium*, *C. tenuicollis* and *D. caninum*, but a negative test was obtained with antigens of *Ascaris*, *Fasciola*, and of pig viscera. Human patients gave a slightly positive reaction with antigens of *Echinococcus* and *C. tenuicollis* only.

O. concludes that these c.-f. and precipitation tests are suitable for use in the diagnosis of human and porcine cysticercosis.—A. L. WILSON.

ACKERT, J. E., EDGAR, S. A., & FRICK, L. P. (1939). **Goblet Cells and Age Resistance of Animals to Parasitism.**—*Trans. Amer. micr. Soc.* **58.** 81-89. 4 figs., 5 tables. [19 refs.] [Authors' summary copied *verbatim*].

1. Evidence is presented which indicates that older chickens have larger numbers of duodenal goblet cells than do younger chickens of the same breed. Evidence of the same kind is given which shows that older rats likewise have larger numbers of duodenal goblet cells than do young rats.

2. By growing young intestinal nematodes, *Ascaridia lineata* (Schneider), in artificial culture media into which mucus from the duodenal goblet cells from resistant chickens was introduced, evidence has been obtained which indicates that the duodenal mucus contains an inhibitory factor for growth of the young *A. lineata*. So far as the authors are aware, the larger numbers of goblet cells in older animals and the occurrence of an inhibitory nematode growth factor in the mucus from the goblet cells have not hitherto been reported.

3. A brief history of literature on age resistance of animals to intestinal nematodes is presented.

FALIŃSKI, S. (1938). Przyczynek do rozpoznawania włośnicy metoda Stäubliego. [**Diagnosis of Trichinosis by Stäubli's Method (1909)**].—*Przegl. wet.* **53.** 422-440. 3 tables. [5 refs.] [German summary].

Demonstration of trichinae in rat blood was possible by the method described by Stäubli (1909), from the eighth to the forty-first day after artificial infection, but not from the fifth day, and in rabbits from the eighth to the 38th day. The larvae were demonstrable, not only in the sediment of a quantity of blood, but also in smears from a drop of blood. Pappenheim's staining method proved the most reliable.

More parasites were found towards the end of the period than in the first few days, so that there was no connexion between the number of parasites found on examination and the number originally used for the infestation.

No trichinae were found in the masseter until the 19th day ; in venous blood they were demonstrable as early as the eighth day, but not until the ninth in artèrial blood.—V. Chládek (Prague).

Morgan, E. (1939). **Pigs in Venezuela.**—*Vet. J.* **95.** 432-436. 1 fig. on 1 plate.

Infestation of pigs with *Stephanurus dentatus* and *Cysticercus cellulosae* is very common in Venezuela ; the latter is present in up to 30 % of pigs reared near towns, but is rare in those allowed free range. It is almost impossible to diagnose the condition during life, unless by demonstration of cysts round the base of the tongue or in the conjunctivae. *Stephanurus dentatus*, however, is found in nearly every pig from the plains, and causes well marked symptoms, including hemiplegia and occasionally paraplegia.—D. D. Ogilvie.

IMMUNITY

Thiele, K. (1938). Untersuchungen über das leukozytäre Differentialblutbild des Rindes bei der intrakutanen Tuberkulinprobe. [**The Leucocytic Blood Picture of Cattle during the Performance of Intradermal Tuberculin Tests**].—*Inaug. Diss., Berlin.* pp. 71. 68 tables. [Numerous refs.]

The influence of the intradermal tuberculin test on the differential leucocytic cell count was studied in 59 non-clinical cattle and in nine " open " cases of tuberculosis.

In cattle showing negative or doubtful reactions where the increase in skin measurement did not exceed 3 mm. there was no significant change in the blood picture, whereas in 36 reactive cattle a definite neutrophilia was found. This increase in segmented leucocytes was evident 12 hours after injection and reached a maximum within 32 hours. Since this peak point preceded the time at which the maximum skin measurement had developed, T. suggests that a differential leucocyte count might usefully be employed to assist diagnosis by the intradermal test. In the blood of four clinical cases similar leucocytic changes were noted 20 hours after infection.—S. J. Edwards.

Long, E. R. (1939). **Tuberculin Anergy and the Variability of Tuberculins.**—*Amer. Rev. Tuberc.* **39.** 551-556. [12 refs.]

L. reviews the studies of previous workers on TB. in man, with special reference to the comparison between the incidence of positive reactions to different tuberculins and diagnosis by X-ray, in both of which methods there is a wide discrepancy.

Calcified tuberculous foci have been found in approximately 5 % of persons negative to the tuberculin test and it is suggested that positive reactions to the test in those cases where they occur are due, not to the allergy initially provoked by the infection in the calcified foci, but to a superimposed infection with fresh lesions. Allergy developed early in life and is apt to wane and disappear, and only recurs on new infection. Evidence suggests that tuberculin allergy is related to the phenomenon of caseation. Anergy in the presence of lesions as exhibited by X-ray raises the doubt as to whether the lesions are tuberculous.

The various preparations of Old Tuberculin vary greatly in potency and in their specificity of action. Reference is made to a recorded instance where two samples of P.P.D. varied in strength.

L. suggests that a definition of infection is necessary and points out that the past and inactive invasion by tubercle bacilli is not so important as the finding out of the recently infected subjects which harbour bacilli.—J. Reid.

Boyd, W. C., & Hooker, S. B. (1938). **Note on the Mechanism of Specific Agglutination.**—*Proc. Soc. exp. Biol., N.Y.* **39.** 491-496. [11 refs.]

This paper describes some simple experiments devised to determine whether the lattice hypothesis or the older two-stage concept explains better the mechanism by which compounds of antigen and antibody combine to form aggregates, as in the agglutination and precipitation reactions.

These experiments show that the lattice mechanism is not involved in agglutination either in the earlier or later stages. In fact, the authors go as far as to say that if the lattice theory were correct, then agglutination, in the form in which it often occurs, would be impossible. It is admitted that the older theory may have to be altered to allow for a certain order of specificity in the stage of secondary aggregation, but in any case it will be under no disadvantage, as compared with the lattice theory, which explains this specificity only by postulating a mechanism that can be shown experimentally not to be operative.—Gwilym O. Davies.

How, A. E. (1939). **A Note on the Calculation of Antibody-Antigen Ratio.**—*J. Immunol.* **37.** 77-83. 2 figs., 2 tables. [2 refs.]

Within recent years a comparatively large number of antibody-antigen systems has been examined quantitatively, and results show that the proportion of antibody to antigen in specific precipitates at optimal ratio varies, but that the proportion for a given system is relatively constant and that the ratio is related to the molecular weight of the antigen. These results suggested a possibility of the theoretical calculation of these ratios. Boyd and Hooker (1934) offered a solution which seems to fit the findings quite well, and in this communication H. supplements and extends their work through the derivation of a simpler equation and the incorporation of a correction-factor.—Gwilym O. Davies.

Porter, E. F., & Pappenheimer, A. M., Jr. (1939). **Antigen-Antibody Reactions between Layers Adsorbed on Built Up Stearate Films.**—*J. exp. Med.* **69.** 755-765. 4 tables. [Numerous refs.]

The authors studied immunological reactions at surfaces by adsorbing antigens and antibodies on barium stearate multilayers. The particular reactions studied were those between pneumococcus specific carbohydrates and purified antibodies in horse and rabbit sera, and also that between diphtheria toxin and antitoxin.

Interested readers should consult this publication for details of methods and results, as they cannot be satisfactorily explained in a short abstract.—G. O. Davies.

Weil, A. J., & Parsons, C. H. (1939). **A Flocculative Reaction of *Perfringens* Toxin and Antitoxin.**—*Proc. Soc. exp. Biol., N.Y.* **40.** 622-625. 3 tables. [8 refs.]

The purpose of this communication is to report a flocculation reaction between the toxin of *Clostridium welchii* (Type A) and its antitoxin, which seems to parallel the flocculation of other toxins and their antitoxins and which also shows close agreement with the mouse-protective values of the antitoxin. For the test, concentrated toxin is essential as the actual amount of toxin present in the unconcentrated filtrate of *Cl. welchii* is too small to show visible flocculation. The antitoxins used were either unrefined or refined sera of hyperimmunized horses.

In 131 tests the correlation between the flocculation and the mouse-test was very satisfactory. Numerous controls were added, but none showed any trace of reaction.
—GWILYM O. DAVIES.

WADSWORTH, A., MALTANER, F., & MALTANER, Elizabeth. (1938). **Quantitative Studies of the Reaction of Complement Fixation with Tuberculous Immune Serum and Antigen.**—*J. Immunol.* **35.** 93-103. 4 figs., 1 table. [8 refs.]

Complement-fixation tests were made with a boiled and dialysed aqueous extract of tubercle bacilli and high-titre immune horse serum, using complement in amounts from 0·001-0·1 c.c. The degrees of haemolysis obtained were first plotted against the quantities of complement used, so that the amounts of complement required for 50% haemolysis could be determined. These amounts were then replotted against the quantities of immune serum or antigen tested. 50% haemolysis was chosen as the significant haemolytic index because, although the form of the haemolytic curve may vary with experimental conditions which necessitate different volumes of complement, that part of the graph near 50% haemolysis is not appreciably affected. The resultant graphs demonstrated a linear relation between complement and immune serum in the presence of the optimal amount of antigen and also between complement and antigen in the presence of the optimal amount of immune serum. Determination of the ratios of the slopes of these straight-line graphs gave constant values for the specific reactive capacity of antigen with immune serum. These quantitative studies seem applicable to experimental investigations of immune serum-antigen reactions and to the evolution of practical diagnostic tests.—R. O. MUIR.

GORET, P. (1939). Quelques aperçus sur la chimie de l'immunité. Conceptions actuelles sur la nature des antigènes. Structure antigénique du bacille tuberculeux. [**The Chemistry of Immunity. The Nature of Antigens. Antigenic Structure of the Tubercle Bacillus**].—*Rec. Méd. vét.* **115.** 449-470.

An analytical review of recent studies by various workers on the antigenic structure of the tubercle bacillus, includes consideration of the researches of SANDOR [(1935). *Thèse de Médecine.* Paris : Doin et Cie.] and his colleagues on the chemical nature of synthetic tuberculin and of an extract of the live bacilli. An anaphylactic, but never an allergic, state could be produced in g. pigs by injections of whole culture filtrate or different protein fractions. Anaphylactic shock resulted in these g. pigs from the intradermal injection of homologous proteins, but not of crude tuberculin. Experimental results suggested the existence in the whole culture of at least three different principles—tuberculin, a very labile tuberculinic antigen, and a protein antigen. The physico-chemical relation between the protein content of the culture and its tuberculinic activity was studied by dialysis, protein denaturation and fractional precipitation of the filtrate from synthetic culture by trichloro-acetic and phosphotungstic acids. Both biological and physico-chemical methods demonstrated the independence of protein content and tuberculinic activity. Attempts to extract tuberculin from bacillary bodies proved most successful with methyl and ethyl alcohols and with ether. These lipoidal properties contrasted with the water-solubility and precipitability by phosphotungstic acid of the tuberculin derived from culture filtrates. A study of the relation between the lipoid content and the tuberculinic activity of the bacillary bodies showed that bacillary tuberculin was adsorbed on certain phosphatide-like lipoids and could be easily liberated. G.'s final conclusions favoured the hypothesis that tuberculin is an unusually adsorbable proteose or polypeptide. A summary of the chemical analysis of live and heat-killed tubercle bacilli is followed by a

description of the immuno-biological properties of the polysaccharide, lipoid and protein fractions of the bacillary bodies. Results of research by various workers on the antigenic structure of the tubercle bacillus are reviewed with reference to protein-lipoid, protein-polysaccharide and polysaccharide-lipoid complexes.

—R. O. Muir.

Marrack, J. R. (1938). **The Chemistry of Antigens and Antibodies.**—*Spec. Rep. Ser. med. Res. Coun., Lond.* No. 230. pp. 194. 27 figs., 26 tables. [Numerous refs.]

This is a revised edition of Report No. 194 issued in 1934 under the same title [*V. B.* **5.** 568.], and M. has collected the more important results of recent experimental work upon the subject, reviewing it in the light of present day knowledge of molecular structure.

Whilst much of the original text remains the same, there are amendments to almost every one of the many sections of each chapter. In the chapter dealing with the specificity of antigens there is a complete new section on cross-reactions in the light of the work of Landsteiner and van der Scheer [*V. B.* **6.** 876.], who used synthetic antigens, and Heidelberger and Kendall [*V. B.* **9.** 557]. M. considers that in cross-reactions in which a single molecular species is used as antigen, some of the antibody to homologous antigen is removed when an antiserum is absorbed or precipitated by a heterologous antigen that gives a visible reaction with it; and that, in those instances in which the amount of antibody to the homologous antigen is reported to be unaffected, the methods of estimating or of recording the residual antibody have not been sufficiently accurate to show the reduction.

Another new section devoted to the effect of low salt concentration in agglutinin reactions is included in the chapter dealing with the reactions occurring in the second stage of the antigen-antibody reaction. Mention is made of the findings of Duncan [*V. B.* **8.** 36.] that the three variables (concentration of the bacterial suspension, concentration of the agglutinating serum and concentration of salt) must be considered in agglutinin reactions. In this chapter, also, a new section is devoted to consideration of the effect of salt concentration, pH and temperature on optimum proportions of antigen to antibody, and *vice versa*, in connexion with the zone phenomenon.

Information with regard to the structure of proteins gained from the use of the ultra-centrifuge is mentioned, and table III giving molecular weights of proteins has been replaced by a table of sedimentation constant and particle weights of proteins. It is pointed out that proteins can be arranged in groups with particle weights approximately equal to whole number multiples of the lowest particle weight, 17,500, suggesting that the molecule is built up by the aggregation of definite fundamental structural forms which differ slightly in weight owing to differences in the amino-acids of which they are formed.

In the chapter dealing with the nature of antibodies the effect on antibodies of various treatments which introduce foreign groups into proteins is dealt with in the light of more recent work, which shows that chemical changes in the serum proteins, *e.g.*, the result of treatment with formaldehyde, reduce the activity of antibodies in a serum, although different antibodies, and the different antibody activities of the same sera, might be differently affected.

In connexion with the maximum precipitation of protein from an antiserum on the addition of antigen occurring not at the equilibrium point, when neither antigen nor antibody is detectable in the supernatant fluid, but when excess of antigen has been added, M. considers that the work of Heidelberger and Kendall

[*V. B.* **9.** 557.] offers an explanation. It is thought that some of the antibody molecules have such a weak affinity for antigen, or so few combining groups, that they can be built into a precipitate with antigen only when more " avid " antibody molecules are present. In the absence of such more avid molecules they cannot form a precipitate with antigen. When antigen is not in excess it combines mainly with the more avid molecules and leaves the less avid ones free. At the first point at which neither antigen nor antibody can be detected in the supernatant fluid after a precipitate has formed, some of these non-avid antibody molecules are left in solution, only an excess of antigen being capable of precipitating all the antibody.
—H. V. HUGHES.

DESCAZEAUX, J., GUILLOT, G., & COURTADE, R. (1939). Note sur l'obtention d'un sérum riche en sensibilisatrices antimalléiniques. [**Production of an Anti-Mallein Serum**].—*C. R. Soc. Biol. Paris.* **130.** 24-26. [3 refs.]

The complement-fixation test is sometimes employed to estimate the antigenic potency of mallein and for this purpose serum from naturally or artificially infected animals is employed. The authors found that a potent serum could be prepared by the use of suspension of the organism in an oily excipient.—G. O. DAVIES

FRIEDEMANN, U., ZUGER, B., & HOLLANDER, A. (1939). **Quantitative Studies on the Neutralization of Pathogenic Agents in Tissues by Circulating Antibodies. II. Concentration Factors. A New Method for the Determination of the Coefficient of Distribution of Antitoxins between Blood and Tissue Fluid. III. The Permeability of the Cerebral Capillaries to Antibodies.**—*J. Immunol.* **36.** 205-217 and 219-230. 16 tables. [Numerous refs.] [For part I, see *V. B.* **10.** 38].

FRIEDEMANN, U., & ZUGER, B. (1939). **Quantitative Studies on the Neutralization of Pathogenic Agents in Tissues by Circulating Antibodies. IV. Specific Factors the Combining Power of the Test-Dose and the Susceptibility of the Experimental Animal.**—*Ibid.* 231-243. 5 tables. [11 refs.]

When antitoxin is injected intravenously it is distributed throughout the body and the amount available for toxin neutralization at any particular site is proportional to the amount originally injected, taking into consideration the coefficient of distribution of antitoxin between the blood and tissues. This coefficient can be calculated for any particular toxin by means of a formula which is explained.

The cerebral capillaries of rabbits and g. pigs are definitely shown to be permeable to antitoxin, since these animals could be successfully protected against intracerebral inoculations of diphtheria toxin by means of intravenous injections of antitoxin.

The formula explained in the second publication is applied to analysing the possibilities of immunizing monkeys passively against poliomyelitis virus. It is shown that if the ability of circulating antibody to neutralize poliomyelitis virus (*in vivo*) is calculated by the given formula (this formula takes into consideration plasma volume, the volume of the test dose of virus, the coefficient of distribution of the antibody, and the quantity of antibody required to neutralize the same test dose of virus *in vitro*), it can be proved theoretically that it is impossible to hope to protect monkeys against poliomyelitis virus by previous injection of convalescent serum. This is well known to be the case in practice.—E. J. PULLINGER.

SEDALLIAN, P., JOURDAN, F., & CLAVEL, C. (1939). Comment étudier physiologiquement la formation des antitoxines. [**Physiological Study of the Formation of Antitoxins**].—*Rev. Immunol.* **5.** 227-240. [Numerous refs.]

The authors discuss the experiments which have been made to ascertain the

tissues concerned in antibody production, together with theories on antitoxin formation. Antitoxin is the only antibody which can be measured with precision and exists practically only in the blood. It develops slowly in the body but the titre rises suddenly after reinoculation. In the rabbit this increase occurs between the fourth and sixth days. The method of examination employed consisted of joining the blood vessels of organs or other parts of a rabbit in the phase of increase of antitoxin to the carotid and jugular of a receptor rabbit, and examining the blood of the latter every four hours. Liver and kidney grafts proved negative. The anterior and posterior limbs both gave positive results. Of these tissues it is most likely that the bone-marrow is the active part.—S. J. GILBERT.

LAHIRI, D. C. (1938). **Use of Non-Specific Substances in the Production of Tetanus and Diphtheria Antitoxin.**—*Indian J. med. Res.* **26.** 311-316. 3 tables. [11 refs.]

Three groups of horses were used for the production of tetanus antitoxin; the first received antigen with 0·25-1·0% alum, the second received antigen with 0·5% tapioca alternating with antigen plus 0·25% $CaCl_2$, the third received antigen alone. Alum caused a slight increase and tapioca and $CaCl_2$, a much greater increase in the antitoxin titre of the serum. In a similar experiment it was found that alum was more active than tapioca and $CaCl_2$ in the production of high titred diphtheria serum.—JOHN FRANCIS.

RIGDON, R. H. (1939). **Effects of Intraperitoneal Injections of Staphylococcus Antitoxin on Subcutaneous Staphylococcic Infection in Mice.**—*J. Lab. clin. Med.* **25.** 251-257. 1 fig. [10 refs.] [Author's summary copied *verbatim*].

Mice passively immunized with staphylococcus antitoxin and given staphylococci subcutaneously show more polymorphonuclear leucocytes and greater phagocytosis than the controls without antitoxin. If the staphylococcus produces a toxin *in vivo* it is neutralized by the antitoxin. The toxin-producing strains of staphylococci remain localized in the immunized mice similar to a nontoxin-producing strain in normal mice.

MAIGNON, F., & THIERY, J. P. (1939). Recherches sur l'origine et la nature de l'alexine. **[The Origin and Nature of Complement].**—*Bull. Acad. vét. Fr.* **12.** 242-248.

In order to test the hypothesis that complement is an enzyme similar to trypsin, the authors added varying quantities of this enzyme to the fresh serum of different animals and tested the complement value of the mixture at succeeding intervals up to 24 hours. During the first few hours the titre gradually diminished but later there was a return to the original titre and even a rise above it. The effect of injecting intravenously into g. pigs a pancreatic digest, obtained from dogs, was the same. These results suggest that the increase in the complement titre is retarded until a combination of a tryptic catalyst with a certain constituent of the blood has taken place. Various protein constituents of the blood were separated and the results of adding euglobulin, pseudoglobulin and albumen fractions respectively to a haemolytic system containing trypsin were noted. It was found that haemolysis was hastened in the system containing the euglobulin fraction. For this reason the authors postulate that complement is a complex of trypsin and a constituent of the blood, probably identified with the euglobulin fraction.

—S. J. EDWARDS.

I. NAGY, D. (1935). Vizsgálatok a sertés- és kutyavérsavók komplementumellenes hatásáról. [**Investigations on the Anti Complementary Action of Sera of Dogs and Swine**].—*Közl. Oesszehas. élét- és kórtan Köréből.* **26.** 425-428.

II. HORVÀTH, L. (1935). Vizsgálatok a kutyavérsavók komplementumellenes hatásáról. [**The Use of Dog Sera in Complement Fixation**].—*Ibid.* 477-485. 3 tables.

I. In N's experiments the albumin : globulin ratio varied between 0·8 and 1·62 in 18 samples of swine serum and between 1·05 and 2·8 in 14 samples of dog serum. The anticomplementary action of the serum of different species of animals is generally in inverse proportion to the albumin : globulin ratio. This action, however, is obscured in dog or swine sera in the fresh state by the fact that they are both haemolytic to sheep erythrocytes. After heating to 50°-60°C., however, the sera develop anticomplementary power, since the heating removes their haemolytic power.

II. H. observed that the albumin : globulin ratio of fresh dog sera varied between 0·6 and 2·17, rising steadily on storage in an incubator. Heating to 50°-55°C. also somewhat raised the albumin : globulin ratio, but at 60°C. there was a remarkable drop. The anticomplementary action of the sera of different species of animals varied indirectly with their albumin : globulin ratios. In the case of dog sera, however, this held good only when the natural haemolysin was destroyed by heating to 55°C. or by three to six days' storage in an incubator at 37°C.

—G. SÁLYI (BUDAPEST).

I. LURIE, M. B. (1938). **Rôle of Inherited Natural Resistance to Tuberculosis.** —*Proc. Soc. exp. Biol., N.Y.* **39.** 176-181. 3 figs., 2 tables. [2 refs.]

II. LURIE, M. B. (1938). **Nature of Inherited Natural Resistance to Tuberculosis.**—*Ibid.* 181-187. 5 figs., 1 table. [2 refs.]

I. By the inbreeding of rabbit groups for four or five generations families were developed which showed an inherited varying and specific resistance to TB. The rabbits were subsequently exposed to natural infection by contact. The most susceptible rabbits developed acute fatal TB. with massive caseation of the bronchial lymph nodes. Those of intermediate resistance developed generalized TB., and those most resistant developed chronic pulmonary TB. with no involvement of the bronchial lymph nodes.

II. Rabbits with a varying inherited resistance to TB. were inoculated intradermally with heat-killed bovine tubercle bacilli. They were later infected intradermally with virulent bovine bacilli. Ten weeks later Indian ink was inoculated intradermally into all the rabbits. The resistance to TB. of each rabbit as measured by its survival was found to be correlated with the permeability of its tissues (indicated by the spread of the ink), the primary inflammatory response to heat-killed bacilli, the degree of sensitization from the virulent infection and the rate of development and healing of the skin lesions produced.—E. C. HULSE.

DISEASES, GENERAL

HORNBY, H. E. (1939). **The Ecological Approach to the Study of Animal Diseases in East Africa.**—*Vet. Rec.* **51.** 1310-1311.

This article is complementary to one written in 1937 on the interrelationship of animal diseases, overstocking and soil erosion [*V. B.* **8.** 454]. H. warns recruits to colonial veterinary services that their duty is not confined solely to

disease eradication in areas to which they are appointed, but that the indications for disease eradication are first dictated by the economics of animal industry in the area concerned. The important thing to aim at is the production of the maximum number of animals without overstocking and the soil erosion which tends to follow overstocking.

Research is now being pursued with the object of controlling the tsetse fly in Tanganyika ; if this is achieved, larger areas will be opened to livestock rearing, but it will be necessary to prevent indiscriminate exploitation of such newly won land. Preparatory work to this end is not being neglected.—J. E.

I. Frei, W. (1939). Allgemeine Bedingungen der Entstehung von Infektionskrankheiten. [**Conditions Necessary for Development of Infectious Diseases**].—*Rep. 13th int. vet. Congr. 1938.* **1.** 155-173. 1 table. [Numerous refs.] [In German : English, French and Italian summaries].

II. du Toit, P. J. (1939). **General Conditions Governing the Origin and Development of Infectious Diseases.**—*Ibid.* 174-192. [In English : English, French, German and Italian summaries].

I. F. believes that resistance to infectious diseases is a part of the total metabolic process and a component of the general biochemical constitution of the subject.

In a comprehensive table, he enumerated the external and internal local and general factors influencing susceptibility and resistance to infectious diseases, and examined in the light of our present biological and biochemical knowledge the general and local internal conditions governing their development.

F. concluded that the creation of favourable living conditions and the breeding of infection-resistant strains should be added to our present methods of combating epizootics.

II. The author defined the term " infectious disease " and stressed the great economic importance of epi- and enzootics. He described the manner in which infections may be spread (direct or indirect, contact, carriers, vectors) and indicated the causes of the appearance of new or seemingly new diseases, as well as the biological, geographical, geological, meteorological, climatic, political and other factors governing their spread. He discussed likewise the mechanism of their natural extinction and artificial eradication.—E. Martin.

Müssemeier. (1939). Ueber äussere und innere Ursachen der Infektion und ihre Auswertung für die Tierseuchenbekämpfung und die Tierzucht. [**External and Internal Causes of Infection and their Significance for the Control of Animal Disease and Breeding**].—*Dtsch. Tierärztebl.* **6.** 297-304. 1 chart. [15 refs.]

M. stressed the importance of external and internal factors, other than those related to specific pathogens, which may play a decisive part in determining the incidence and course of sporadic and epizootic disease. Examples of such factors are unsuitable feeding, overwork, pregnancy, exposure, hot or sultry weather, exhausting journeys, mixed infections, previously existant disease, and hereditary or acquired artificial or natural immunity and/or resistance. M. doubted the value of attempts to breed disease-resistant strains and uttered a warning that specific immunity to one disease might result in increased susceptibility to others. Other predisposing factors are excessive exploitation of stud, working and milk-yielding animals, with consequent undermining of their constitution. M. stated that tuberculosis in cows decreased rapidly in Germany during the last war, when, on account of the blockade, concentrates could not be imported and high-yield feeding was impossible.—E. Martin.

WARD, A. H. (1939). **High Production and Its Relation to Disease in Dairy Cattle.**—*Emp. J. exp. Agric.* **7.** 350-356. 6 tables.

It would appear that the much-quoted statement that " the high-producing cow is more susceptible to disease than the low-producing cow " is based on general impressions and not on analyses of actual data. This article deals with the problem under New Zealand conditions, where it is emphasized that dairy cattle are kept under natural herd conditions as distinct from conditions in which unnaturally high planes of nutrition prevail. After a consideration of data on mastitis, sterility and general wastage, W. concludes that it is difficult to find evidence that natural high production is responsible for any increase in the incidence of disease, or that such high production, in itself, increases a cow's susceptibility to disease. It is possible, however, that there may be some correlation between high-producing herds and disease, but that the determining factor is not high production but conditions associated with management, such as feeding.

—N. J. SCORGIE.

O'DEA, A. F. (1939). **Remarks on Some of the Diseases of Dairy Cattle.**—*Vet. Rec.* **51.** 1381-1394. 1 table. [Numerous refs.]

A general review with special reference to mastitis, tuberculosis and brucellosis. A considerable discussion on clinical lines followed.—J. E.

BARRON, N. S., DAVIS, J. G., & MCCLEMONT, J. (1939). **Mastitis. I. The Nomenclature of Abnormal Milks. II. Clinical Examination. III. Field and Laboratory Diagnosis with Special Reference to Udder Counts and Methylene Blue Reduction Time. IV. Mastitis in Relation to Cheese-Making.**—*Agr. Progr.* **16.** 23-37. [18 refs.]

The authors introduce this paper by a classification of the causes of abnormal milk.

The clinical aspects of the different forms are described in relation to the causal organisms and reference is made to the methods of control. Of the indirect methods of diagnosis, the estimation of the total udder milk bacterial count is preferred and counts below 100 per ml. have been found to signify freedom from infection.

The factors responsible for the unsuitability of mastitis milk for the manufacture of cheese are outlined, and simple tests for detecting defects are given. It was found by experiment that milk containing a high bacterial count and evidence of mastitis, as disclosed by the catalase test, formed an unsatisfactory cheese. In order to determine the suitability or otherwise of the milk of individual cows, the brom-cresol purple rennet test is advocated, and the catalase test for bulk samples at factories.—S. J. EDWARDS.

JOHNSON, S. A. (1939). **Disease Problems in Goat Dairies.**—*Cornell Vet.* **29.** 166-172.

J. describes some of the conditions which he has been called upon to treat in a herd of milch goats kept under conditions similar to those under which dairy cattle are kept. Goats stabled in this way appear to be susceptible to pneumonia, and during one winter 12 out of a herd of approximately 54 animals were lost for this reason. The major trouble in the herd was due to worm parasitism, particularly with *Haemonchus contortus*, *Bunostomum trigonocephalum* and *Trichostrongylus* sp. in the stomachs and with various species of intestinal worms. Treatment consisted first in administration of 3 c.c. of a 3-5% solution of $CuSO_4$ to stimulate closure of the oesophageal groove, followed by 11 c.c. of mineral oil and 11 c.c. of

tetrachlorethylene given from a special syringe. Pasture rotation during the summer, involving the use of three pastures and changing every ten days, was very successful in diminishing the severity of the worm infestation. It is stated that goats are susceptible to most of the worm parasites of cattle and sheep, including lungworms and liver flukes.

Other diseases which caused trouble in this particular herd were goat pox and mastitis. One of the most difficult problems in goat dairies is to induce goats to breed so that a steady supply of milk is ensured. Various " glandular products " have been used ; it would appear that these tend to bring about oestrus without ovulation.—N. J. SCORGIE.

I. RINJARD, P. (1939). Le coryza gangreneux. [**Bovine Malignant Catarrh**]. —*Rep. 13th int. vet. Congr. 1938.* **1.** 541-552. [10 refs.] [In French : English, German and Italian summaries. Discussion pp. 569-570 in English and German].

II. DU TOIT, P. J., & ALEXANDER, R. A. (1939). **Malignant Catarrhal Fever and Similar Diseases.**—*Ibid.* 553-559. [7 refs.] [In English : French, German and Italian summaries. Discussion pp. 569-570 in English and German].

I. R. reviewed the current knowledge of this disease, including his own experiences. GOETZE and LIESS (1929) were the first to show that the disease could be reproduced in the bovine by subcutaneous or intravenous inoculation of infected blood. A number of workers have since shown that the success of this procedure depends on the virulence of the infecting strain of virus. DAUBNEY and HUDSON [*V. B.* **7.** 21.] transmitted the infection from the brain and lymph nodes and also reproduced the disease in rabbits, g. pigs and mice. The experimental disease in the bovine is the same as the natural disease, the incubation period being also the same, from 15-60 days.

Under natural conditions cattle and water buffaloes are the only animals to show the classic form of the disease. Sheep are known to be latently infected. R. considers sheep to be important in the causation of the open form of the disease in cattle. The possibility that there is an insect or rodent vector should be considered.

II. The authors discussed the relationship between European malignant catarrhal fever and South African " snotsiekte ". Although it has been generally considered that the two diseases are not the same, they conclude that the differences are not sufficient to warrant this distinction. They consider the two conditions to be due to different strains of the same causal agent, modified by differing environments.

In South Africa the causal agent has found a reservoir host in the wildebeest (*Connochaetes gnu* and *Connochaetes taurinus*). The African form seems to be more easily transmitted artificially by blood than the European form, and it presents some special clinical features.

The authors consider that the role of the sheep as a reservoir, is not finally established in the European form.—D. L. HUGHES.

WYSSMANN, E. (1939). Bösartiges Katarrhalfieber und ähnliche Krankheiten. [**Malignant Catarrh and Similar Diseases**].—*Rep. 13th int. vet. Congr. 1938.* **1.** 560-569. [Numerous refs.] [In German : English, French and Italian summaries. Discussion pp. 569-570 in English and German].

A good general review complementary to the articles by RINJARD and by DU TOIT and ALEXANDER (see above). In an addendum, W. describes an investigation into the disease in the Berne canton where 400 cases occurred in three years.

Meteorological records were kept and it was shown that the disease occurred at times of unfavourable changes in the weather.

In a discussion in these three reports, GOETZE referred to his research [*V. B.* **1.** 90] and stated that he had found it possible to arrest outbreaks in cattle by breaking contact between them and sheep. DAUBNEY said that the next step in research was the discovery of the mechanism of the role of the sheep (in Europe) and the wildebeeste (in Africa) as transmitters of the disease. He also outlined the progress of research in Kenya.—J. E.

SCHRÖTER, H. F. (1939). Die Schwankungen des Blutzuckerspiegels bei kranken Pferden. [**Variation in the Blood Sugar in Sick Horses**].—*Arch. wiss. prakt. Tierheilk.* **74.** 454-496. 34 figs., 6 tables. [Numerous refs.]

Blood sugar values in healthy horses varied between 64 mg. % and 125 mg. % with average value 84 mg. %. No regular diurnal variation was observed, but over twelve-hour periods in horses fed thrice daily, blood sugar rose 5%-54% above fasting values. In myoglobinuria paralytica, rise of blood sugar was observed in nine cases out of ten; average 138 mg. % with range 71-330 mg. %. In constipative colic no change was noted in mild cases but elevation up to 146 mg. % occurred in severe cases. High values were also noted in overloading of the stomach and tympany; range 82-210 mg. %. No changes were associated with enteritis or pharyngitis. Rise was recorded in severe strangles. In pneumonia the tendency was towards rise of blood sugar, with fall as fever abated; average value 91 mg. %, range 72-172 mg. %. In purpura haemorrhagica average was 108 mg. % with range 70-147 mg. %. High values were often encountered in horses with abscesses and in fever.—H. H. GREEN.

BROWNLEE, A. (1939). **Grass Disease of Horses and Game Preservation; Their Possible Correlation: an Hypothesis and an Appeal.**—*Vet. Rec.* **51.** 1404-1407. [Numerous refs.]

A possible correlation between grass sickness and game preservation is discussed. A number of observations are cited to support the hypothesis:—(1) Grass sickness is prevalent in most arable areas of Scotland except in the industrial Forth and Clyde belt where game preservation is little practised. (2) In cases which do occur in the latter location there has generally been some local game preservation. (3) The magpie and carrion crow, well known predators, are now common only in the Forth and Clyde district. (4) Generally there is much less game preservation in England and a corresponding low incidence of disease. (5) Norfolk, in which there would appear *prima facie* a discrepancy, receives flocks of hooded crows on migration.

Further observations are necessary before the value of the hypothesis can be assessed.—D. D. OGILVIE.

APOLLOSOVA, P. A. (1938). Streptokokkovaya pneïmoniya zherebyat kak oslozhnenie pri nuttalliose. [**Streptococcal Pneumonia of Foals as a Complication of Nuttalliasis**].—*Trud. Uzbek. nauchn.-issled. vet. Stan., Tashkent.* **10.** 59-68. 1 chart. [7 refs.] [English summary].

A. investigated the causes of pneumonia in foals in a breeding stud during the summer months and found *Nuttallia equi* in blood smears of 24 out of 30 affected foals. Further investigation showed that streptococci and *Salmonella abortus-equi* were pathogens in the stud. The drinking water was found to be contaminated with *Streptococcus pyogenes* and *Salmonella.*

A. assumes that the outbreak of pneumonia was due to a mixed infection.

He suggests that *Streptococcus pyogenes*, not normally pathogenic, was able to induce disease owing to the low resistance of the animals, which had been weakened by the nuttallia invasion and possibly by intra-uterine salmonella infection.—E. M.

HAMMOND, J. (1939). **Physiological Aspects of Bovine Sterility.**—*Vet. Rec.* **51.** 1137-1149. [Numerous refs.]

The factors leading to temporary sterility in cows are discussed in relation to the normal physiological processes of reproduction. The bull should be capable of producing a maximum number of spermatozoa in order to ensure that one of them fertilises the ovum at the top of the Fallopian tube just after ovulation. Also spermatozoa should be vigorous. As a rough guide, the greater the opacity of the semen the larger will be the content of spermatozoa, and an acid semen, being an indication of the production of carbon dioxide due to the activity of the spermatozoa, points to their vigour. No satisfactory means of increasing sperm production has yet been discovered.

Deficiency in vitamin E is a known factor in sperm deficiency, but, in general, it is unlikely that the diet of the bull will be found to be wanting in this vitamin.

In the cow, such conditions as inflammation of the external os, incomplete relaxation and opening of the cervix during oestrus, incomplete liquefaction of the mucin, or failure to cleanse completely after calving, leading to a certain amount of inflammation, diminish the chances of fertility. The mechanism of the oestrus cycle, which has been shown to consist of a delicately adjusted balance between the internal secretions of the anterior pituitary and the two ovarian secretions, is discussed, and so is the relation to the oestrus cycle of the formation of ovarian cysts, and the corpora lutea in non-pregnant cows. Operative measures applied in the control of ovarian function are given in detail.

It is considered that the injection of gonadotrophic hormones offers great possibilities, but standardized pure products are not yet available, and much research is required concerning their application. At present it seems likely that the repeated injection of animals with gonadotrophic hormones may aggravate rather than alleviate the problem of sterility.—R. ISHERWOOD.

POLYAKOV, I. A., & MIKLASHEVSKIĬ, V. N. (1936). Preodolyet' bezplodiye hibridov tura s yakom. [**Methods of Overcoming Sterility in Bison-Yak Hybrids**]. —*Trud. Sib. nauchn.-issled. Inst. Zhivot.* **1.** 33-38. 3 figs.

A scheme is described of " convergent heterogenic " serial crossings by which it is possible to produce fertile hybrids resembling in type and characteristics first-cross half-breeds, the males of which are normally sterile.

The object is to breed a new hybrid bovine embodying the valuable characteristics of the parent species.—E. MARTIN.

LOURENS, L. F. D. E. (1939). La stérilité d'origine microbienne chez les bovins. Prophylaxie et traitement. [**Sterility of Microbial Origin in Bovines**].—*Bull. Off. internat. Epiz.* **18.** 237-252. [Numerous refs.] [Discussion pp. 464-469].

Bovine sterility of infectious origin may be due to the following bacteria :– *Mycobacterium tuberculosis*, *Brucella abortus*, Streptococci, *Bacterium equirulis*, *Bact. coli*, *Vibrio foetus* or *Trichomonas foetus*. While the pathology, prophylaxis and treatment of the conditions are described according to the recognized manner, the facts noted regarding infection due to *Trichomonas* are especially interesting. L. quotes evidence from the literature regarding the problematic role of this parasite in causing sterility and allied conditions. Certain workers postulate that

this parasite takes the part of a secondary invader and that some other organism, possibly a virus, is responsible for primary infection. The observations of other workers, however, support the invasive action of the parasite and the direct experiments of HOGUE [*V. B.* **9.** 838.] in particular, clearly demonstrate its toxic action on the living cell.

The clinical disease appearing in the cow following infection with *T. foetus* at service depends upon the number of infecting organisms. Following a massive dose, a catarrhal inflammation of the vagina and uterus ensues, with failure in fertilization resulting in sterility. A smaller number of organisms may not immediately affect the development of the foetus, but usually causes metritis and abortion at a later stage in pregnancy.

Attempts to control the spread of infection in a herd should be mainly directed towards the detection of infected bulls, and, if possible, towards the practice of artificial insemination. Regarding treatment, L. points out the necessity for finding some substance exercising a specific action on the parasite.—S. J. EDWARDS.

POLICARD, A., & VELU, H. (1938). Sur les infiltrations siliceuses observées dans les poumons des brebis vivant dans les zones sablonneuses du Maroc. **[Siliceous Infiltration Seen in Lungs of Sheep Living in Sandy Regions of Morocco].**—*Ann. Anat. path. méd.-chir.* **15.** 859-866. 2 figs. [5 refs.]

The authors examined microscopically the lungs of seven sheep from northern Morocco, where they had lived in a very dusty atmosphere.

Small accumulations of sand were found throughout the lungs, showing in stained sections as gray, unstained foci, but better still in sections examined by dark ground illumination, when they shone brightly against the dull background of the lung tissue. The predilection sites were the lymph spaces and fibrous tissue spaces around the bronchioles. Sand grains were also seen, but not to a large extent, engulfed in monocytes between alveoli.

Lung tissue reaction to the sand was remarkably slight; this is an indication of the relative efficiency possessed by lung tissue in dealing with foreign bodies. —J. E.

I. —. (1936). **Summary of Shock Disease in Relation to Cyclic Decline.**—*Minn. Wildlife Dis. Invest.* pp. 1-3.

II. —. (1937). **The Status of Shock Disease in the Snowshoe Hare.**—*Ibid.* pp. 59-64. 5 tables.

III. —. (1937). **The Status of Shock Disease in the Snowshoe Hare.**—*Ibid.* pp. 66-74. 7 tables.

IV. —. (1937). **Shock Disease and the Snowshoe Hare Cycle.**—*Ibid.* pp. 124-126.

V. —. (1937). **Shock Disease in the Snowshoe Hare.**—*Ibid.* pp. 134-136.

I-V. Investigations were carried out regarding the effects of disease on wild animal populations and the relation of disease to the cyclic fluctuation of the species concerned. It appears that decimation of snowshoe hare populations occurs with regularity at approximately 10-year intervals and that such a cyclic decline occurred in the winter of 1934-35 and reached its lowest point in the spring of 1936. A definite disease entity was then recognized and to it the Minnesota Wildlife Disease Investigation authorities gave the name of " shock disease ". The cause of this condition seems to be associated with some factor in the ground which increases with the hare population and its effect is to produce characteristic toxic changes in the tissues which seriously interfere with the sugar metabolism. In the vast majority of cases shock disease is characterized by the sudden development of

convulsive seizures during which the animal displays opisthotonic retractions of the head and neck, running movements of the legs, and foaming at the mouth. Death usually follows within an hour. On P.M. examination, the liver is found to be mahogany in colour, soft in consistency, and atrophic ; the atrophy being of such a degree that the capsule appears as a wrinkled grey membrane. Chemical analysis shows the glycogen content of the liver to be from 0·02-0·18% (normal average 5·5%). Intravenous inoculations of 5-10% glucose solution into sick hares resulted in a temporary recovery, but inoculations of adrenalin had no effect. All attempts to isolate a transmissible agent from animals dying of the disease were unsuccessful.—J. R. LAWSON.

WYSSMANN, E. (1939). Kommt die Blutfleckenkrankheit auch bei Ziegen vor? **[Purpura in Goats].**—*Schweiz. Arch. Tierheilk.* **81.** 212-215.

W. states that little reference to purpura in goats has appeared in the literature. He describes the symptoms observed in a nine-year-old female goat.—H. E. H.

KING, L. S. (1939). **Disseminated Encephalomyelitis of the Dog.**—*Arch. Path.* **28.** 151-162. 4 figs. [11 refs.]

A case of disseminated encephalomyelitis with demyelination is described in a dog. The symptoms included spasticity, stiffness of gait, clonic movements of the forelegs, ataxia and absence of reflexes in the hind limbs and trunk. The animal was destroyed and the only macroscopic lesions comprised a haemorrhagic cystitis (due to spinal cord lesions) and cavitation near the central canal of the spinal cord. The lesions observed in histological sections were scattered throughout the brain and spinal cord, being more severe in the latter. There was marked perivascular " cuffing " with demyelination related directly to the inflammatory foci. The axis cylinders remained intact even where myelin destruction was complete, thus indicating the selective action of the causal agent on myelin sheaths. Discrete focal lesions were found in the medulla, pons and cerebellum as well as in the optic chiasma, hippocampus and elsewhere.

Intranuclear inclusions similar to those recorded by several workers in the nervous form of canine distemper were not present and the aetiology of the condition was not determined.—E. G. WHITE.

I. HADFIELD, G. (1939). **The Primary Histological Lesion of Regional Ileitis.** —*Lancet.* **237.** 773-775. 4 figs.

II. ANON. (1939). **Significance of the Giant Cell [Ileitis].**—*Ibid.* 795.

I. The characteristic histological changes in this condition in man are lymphadenoid hyperplasia with the formation of non-caseating giant-cell systems in the submucosa and regional lymph nodes. No acid-fast bacilli are demonstrable in the lesions. The structure is indistinguishable from a tuberculous reaction, but the lesions frequently regress and in many respects are similar to the lesions of Boeck's sarcoidosis. A relationship to tuberculosis cannot be excluded until careful cultural and inoculation experiments have been carried out.

II. Giant cells have been divided by DOAN, SABIN and FORTENES, using vital staining, into two groups :– epithelioid giant cells with amitotic division and a rosette of fine vacuoles, and foreign body giant cells, varying widely in size and structure and with no constant cytological pattern. The Langhans type of giant cell, characteristic of tuberculous lesions, almost certainly belongs to the first group. It is suggested that the histological changes in regional ileitis may in fact

be tuberculous in origin and caused by the passage of dead tubercle bacilli or their products from the intestinal tract into the submucosa and lymphadenoid tissue.
—E. G. WHITE.

KARADY, S., & BROWNE, J. S. L. (1939). **Effect of Histaminase Treatment of Histamine and Anaphylactic Shock in Guinea Pigs.**—*J. Immunol.* **37.** 463-468. [17 refs.]

The intravenous injection of three units of histaminase 15 minutes before the intra-abdominal injection of 4 mg. of histamine prevented in most instances the symptoms of histamine shock in g. pigs. Of the 20 animals pre-treated with histaminase, six showed slight symptoms after 15 minutes; these symptoms disappeared in a few minutes in all but two animals, which died 35 minutes after the histamine injection. The ten control animals all showed marked symptoms within five to seven minutes and seven died shortly after.

Anaphylactic shock after the intra-abdominal injection of 2 ml. of 50% egg-white, was completely prevented in 15 out of 20 previously sensitized g. pigs, by intravenous injection of histaminase 15 minutes before the administration of the egg-white; the other five animals showed only very slight symptoms, beginning 20 minutes after the injection of the egg-white and lasting for a few minutes. The ten control animals, also previously sensitized, all showed severe anaphylactic shock developing within 5-10 minutes and four animals died 10-14 minutes after the egg-white injection.—R. ALLCROFT.

ANON. (1939). **Chemical Agents and Viruses in Cancer.**—*Brit. med. J.* Sept. 23rd. 651-652. [9 refs.]

The vexed question of the influence of two types of agent—chemical and microbic—on the development of malignant growths, is still widely debated. Recent investigations, however, have served to narrow the gap which separates two opposing schools of thought.

The original observation of ROUS on the filtrability of certain fowl sarcomata led to experiments by GYE and others on allied types of tumours. It was soon found that there was a marked inconstancy in the presence or absence of filtrable agents in closely related tumours. As a result of these findings some of the greatest authorities maintain that non-filtrability of tumours which are transmissible is not a certain proof of the absence of virus. MACINTOSH and SELBIE [*V. B.* **9.** 795.] have shown that, whereas a large proportion of chemically-induced sarcomata in fowls are virus tumours, there are some in which filtrates are apparently non-infective. They suggest that the consistent inactivity of filtrates of certain induced tumours may be due to variation in the relation of the virus to the tumour cells which prevents its detection.

The Shope papilloma virus has also yielded interesting results. ROUS, KIDD and BEARD [*V. B.* **7.** 331.] and ROUS, P. [(1936). *Amer. J. Cancer.* **28.** 233.] have shown that autologous grafts of these tumours introduced into the internal organs of the rabbit give rise to growths resembling carcinomata. Under these conditions the virus completely disappears, though serological evidence of its presence can still be obtained. ANDREWES, AHLSTROM, FOULDS and GYE [(1937). *Lancet.* **32.** 893.] have also found that the injection of Shope fibroma virus into rabbits which have received intramuscular injections of tar, induces local sarcomatous growths [see also *V. B.* **9.** 162].

It is conceivable that mammalian tumours contain agents which cannot transform normal tissues into tumours unless they have been altered by carcinogenic agents. Such an hypothesis has yet to be proved, but current research lends colour to the theory.—R. E. GLOVER.

LINDENBERG, A. (1937). Ein neuer Gesichtspunkt in der Krebsforschung. [**A New Aspect of Cancer Research**].—*Verh. dtsch. path. Ges.* **30.** 367-374. 5 figs., 1 table. [Abst. in *Amer. J. Cancer.* **35.** 114, copied *verbatim.* Signed: Milton J. EISEN].

Blood serum of patients with pemphigus foliaceus or psoriasis was injected into the testicles of the rabbit and the guinea-pig. Practically 100 % of the animals developed similar, although milder, skin conditions in various portions of the body. Each disease was transmissible in series by injection of the serum of the infected animals.

On the assumption that cancer may also be a general infection, caused possibly by a virus, an intratesticular injection of 2 c.c. of serum of patients with various forms of malignant disease (cancer of the stomach, uterus and breast; spindle-cell sarcoma) was given to 30 rabbits and 30 g. pigs. Adenoma of the epididymis developed in 10 (43 %) of the 23 rabbits that survived. The growths were observed after intervals varying from 48 to 640 days. They had a diameter of 0·2-1·5 mm., and were encapsulated. Multiple lesions were common. They were made up of large cubical, cylindrical, or polygonal cells somewhat similar to the cells of the adrenal cortex. In two rabbits involvement was bilateral, and in one animal the contralateral epididymis was affected. Multiple growths of a similar nature developed on the non-injected side of one g. pig 90 days after treatment with the serum of a patient with a spindle-cell sarcoma.

A photograph of the skin lesions of the first experiment and photomicrographs of the epididymal conditions are reproduced.

I. GERLACH, F. (1937). Elementarkörperchen bei malignen Tumoren. [**Elementary Bodies in Malignant Tumours**].—*Wien. klin. Wschr.* **50.** 1180.

II. GERLACH, F. (1937). Ergebnisse mikrobiologischer Untersuchungen bei bösartigen Geschwülsten. [**Results of Microbiologic Studies on Malignant Tumours**].—*Ibid.* 1603-1610. 6 figs.

III. SCHMIDT, W. (1938). Ergebnisse mikrobiologischer Untersuchungen bei bösartigen Geschwülsten. Bemerkungen zu dem Vortrage und Artikel von Prof. F. Gerlach in Nr. 44 und 47, 1937, dieser Wochenschrift. [**Observations on the Papers by F. Gerlach on Virus Neoplasms**].—*Ibid.* **51.** 146-147.

IV. CLAUBERG, K. W. (1939). Ueber die Verwendbarkeit des Fluorescenzmikroskopes in der bakteriologischen Praxis, zugleich über die Frage des Vorkommens virusartiger Mikroorganismen in menschlichem Krebsgewebe. [**Utilization of the Fluorescent Microscope in Bacteriology and Observations on the Finding of Virus-Like Micro-Organisms in Human Cancer**].—*Klin. Wschr.* **18.** 632-635. [10 refs.]

[Absts. in *Amer. J. Cancer.* **37.** 458-459, copied *verbatim.* Signed Milton J. EISEN].

I-IV. Gerlach reports the isolation and cultivation of virus bodies from various animal and human tumors. Injections of cultures of the organisms were capable of initiating neoplasia in a small number of animals. Staining with Victoria blue of direct tumor smears or of smears of cultures, and examination with the aid of the fluorescent microscope of preparations stained with primulin, were utilized in the demonstration of the tumor viruses.

For the preparation of cultures the juice expressed from a tumor was diluted 1:10 or 1:15 with saline, Ringer's solution, or bouillon, and passed through a filter candle to free it from cells and bacteria. The filtrate was inoculated in suitable artificial liquid or solid media, especially blood agar or brain mash mixture (pH 7·6-8·0), not containing living cells and incubated anaërobically at 37°C. for

three to six days. Solid media proved better adapted for continuous cultivation of the organisms. Several strains are said to have maintained their viability during twenty to fifty successive passages on blood plates. The cultural characteristics of smooth and rough colonies are described in detail. No differences were observed in organisms isolated from human and animal carcinoma or sarcoma.

Morphologically the filtrable agent of tumors is described as not unlike that of contagious pleuropneumonia of cattle. A cycle of development apparently exists, consisting of a resting stage in the form of an elementary granular virus body and a second form which is described as a micromycete. The organism was also cultivated successfully on the chorio-allantoic membrane of the chick.

Suspensions of cultures varied in their pathogenicity for the common laboratory animals. Injections into mice were frequently followed by a generalized infection after one to several days. A polyserositis was characteristic and both elementary bodies and micromycetes were demonstrable in smears of the exudates. In many animals the infection tended to subside and become latent.

Tumors developed in 14 of 342 animals injected with cultures after periods varying from one to nine and one-half months. Organisms isolated from five human cancers, when administered subcutaneously, intramuscularly or intravenously, gave rise to such variegated tumors as peritoneal sarcoma in the rat; mammary, salivary gland or lung cancer in the mouse; teratoma of the testicle in the rooster, and cancer of the oviduct in the hen. A tumor culture of spindle-cell sarcoma of the upper jaw in a chamois produced a carcinoma of the colon in the rat. All induced tumors contained organisms identical with those originally isolated, and in two instances the newly isolated viruses were capable of producing additional tumors on injection. It is striking, however, that the organisms derived from the Ehrlich mouse carcinoma should produce subcutaneously in two animals at the point of injection tumors corresponding histologically with the original growth. Other tumors elicited differed remarkably in their morphology from the original growths and never appeared at the site of injection.

Photomicrographs illustrate the morphologic characteristics of the isolated tumor organisms.

Gerlach's work has not been accepted. W. Schmidt, who with his father, O. Schmidt, has for years been talking about cancer parasites, claims that they were the first to discover this organism. Neumann, speaking before the *Gesellschaft der Arzte in Wien* stated that Gerlach's organism is the same as Schmidt's.

Clauberg, discussing the use of methods of fluorescent microscopy in demonstrating organisms, says that he has not been able to confirm Gerlach's work though some of the ultramicroscopic parasites, such as those of molluscum, vaccinia and the mosaic virus of tobacco, can be demonstrated. In his opinion there is no specific filtrable and culture organism in malignant tumors such as Gerlach has claimed.

Gerlach's paper is also the subject of an editorial in the *Lancet*. This refers to the wide publicity which the work received in the daily press and goes on to say that even if one assumes that all the tumors that appeared—14 in 342 animals—were true malignant new growths, which is by no means certain, the small number observed does not exceed the number of spontaneous tumors to be expected in laboratory animals, especially the short-lived rat and mouse, kept under observation for several months. The editorial concludes: " The story is not new. It reveals no appreciation of the pathology of cancer ".

[Obviously Gerlach has not succeeded in establishing the claims which he made. In this connexion it is important to remember that organisms of various types are demonstrable in the normal organs of healthy human beings and of animals,

and also in human and animal tumors provided proper culture technic is employed. This was shown, I think by Ford at Johns Hopkins, thirty years ago or more and is continually being demonstrated in studies made of puncture materials and fresh tissues obtained at autopsy both in man and animals. Mice carry as a saprophyte a spirochete which can be easily demonstrated in the peritoneal fluid of healthy animals, the famous organism which Gaylord and Calkins described many years ago in mouse tumors. All of these alleged demonstrations of bacteria in cancer tissues must therefore be accepted with the greatest scepticism. Scarcely a year passes that some apparently competent laboratory man does not publish a " discovery " of this sort.

Woglom and Warren recently succeeded in isolating a filtrable organism resembling the viruses from rat sarcoma 39. This agent, which proved to be a pleuropneumonia-like organism, produced suppurative lesions in the rat, mouse, and rabbit, but was incapable of inducing tumors. No immunologic relationship to sarcoma 39 was detected. The authors concluded that the agent was a chance contaminant of the transplantable tumor].

BRONKHORST, J. J. (1938). **The Genetic Nature of Susceptibility to Cancer.**—*J. S. Afr. vet. med. Ass.* **9.** 52-59 and 128-135. 6 tables. [Numerous refs.]

B. refers to experiments carried out on closely inbred mice susceptible to a mammary tumour in which it was shown that the factor concerned in the transmission was an extra chromosomal one. In the case of lung tumour, however, there was transmission through male and female alike, not through the female only, as in the mammary tumour.

The behaviour of the tumour tissue in the process of transplantation in transplantable tumours is apparently controlled by the biological constitution of the tumour cell. The article is in the nature of a critical review of the subject.

—E. M. ROBINSON.

WESTENHÖFER, M. (1937). Krebs und Progonismus. [**Cancer and Progonism**].—*Verh. dtsch. path. Ges.* **30.** 293-304. [1 ref.] [Abst. in *Amer. J. Cancer.* **35.** 119, copied *verbatim.* Signed : Milton J. EISEN].

Progonism is a term employed by the author to imply that all forms of living matter, beyond certain primitive stages contain latent anlagen or characteristics of earlier cycles of evolution or development. In man, examples of this tendency are the presence of accessory breasts, the mongolian spot, a prolongation of the second toe, and certain atavistic reflexes of childhood. Many other organic and functional manifestations may be discovered in man and in the animal and plant kingdoms. The author expounds a theory on the causation of cancer based on this principle. The cell responsible for the development of a new growth is one corresponding to the common ancestral unicellular form of life. This latent primordial cell in the higher organism, apparently by means of a combination of environmental and internal factors, assumes an independent and parasitic existence. Thus liberated from its bonds of restraint, it gives rise to the autonomous cells which are recognized as cancer cells.

KARDJIEV, B. (1937). Die Vorgänge bei der Resorption injizierter Geschwulstzellen des Brown-Pearceschen Kaninchenkrebses bei immunisierten Tieren. Ein Beitrag zur Frage der Geschwulstimmunität. [**Resorption of the Brown-Pearce Rabbit Carcinoma to Immunized Animals. Contribution to the Problem of Tumour Immunity**].—*Frankfurt. Z. Path.* **51.** 391-405.

3 figs. [Numerous refs.] [Abst. in *Amer. J. Cancer.* **35.** 431, copied *verbatim.* Signed: Wm. H. Woglom].

The cells of the Brown-Pearce carcinoma, injected into the blood stream, are attacked and destroyed in the pulmonary small arteries and capillaries of resistant rabbits by accumulations of leukocytes, particularly those of the eosinophile class, and later by granulation tissue, fibroblasts, alveolar epithelium, and probably by endothelium. So intense is this reaction that after the fifth day it is hard to distinguish between tumor cells and the elements that intrude among them and thus participate in the defensive response. The reaction is almost entirely confined to the lungs.

Bertrand, I., Blanchard, & Salles, P. (1937). Lipome du mésocéphale chez un cheval. Oblitérations de l'aqueduc de Sylvius et l'hydrocéphalie. **[Lipoma of the Mesencephalon in a Horse. Obliterations of the Aqueduct of Sylvius and Hydrocephalus].**—*Rev. neurol.* **67.** 417-420. 2 figs. [4 refs.] [Abst. in *Amer. J. Cancer.* **35.** 433, copied *verbatim.* Signed: Edward Herbert, Jr.].

At autopsy on a horse that was killed at the age of fifteen years a lipoma was found which obstructed the aqueduct of Sylvius and caused hydrocephalus. No similar case was found in the literature. The symptoms are not described. Two photographs are included.

Lagerlöf, N. (1939). **Pathological Changes in the Testicle, with Special Reference to Impotence in the Bull.**—*Vet. Rec.* **51.** 751-754. [Translated from *Münch. tierärztl. Wschr.* **88.** 437-441, 448-453 and 461-465. (1937)].

Although many cases of hypoplasia testis have been reported in the human subject, there are few records in animals. L. describes the condition in 25 bulls. All appeared healthy; they served willingly but were sterile. The cases were divided into three groups according to the development of the testicles.

Group 1 consisted of eight bulls in which hypoplasia was complete, and no spermatozoa could be demonstrated in sperm samples. Macroscopically, the testicles were small and firm. The cut surface appeared dry, and there was no protrusion of the matrix. Microscopically, in all seminiferous tubules only one layer of undifferentiated germinal cells was present.

Group 2 comprised nine bulls; six were completely sterile, and three were of low fertility. Semen samples gave counts of less than 100,000 sperms per c.c. The sperms were degenerated or immature. Microscopically, one-half to two-thirds of the seminiferous tubules were undeveloped. The remaining tubules showed only commencing spermatogenesis. The presence of giant cells suggested that some check had prevented the germinative epithelium from reaching maturity.

Group 3 consisted of eight bulls, all completely sterile. The sperm count was 50,000-150,000 per c.c. Motility was decreased, and degenerated and immature forms were common. The testicles were normal in size. Microscopically most tubules showed active spermatogenesis accompanied by degenerative changes. Giant cells and vacuoles were numerous.

In none of the groups were symptoms of inflammation or fibrosis present, and all the cases were regarded as examples of true hypoplasia.—D. D. Ogilvie.

McDonald, J. R., Schlotthauer, C. F., & Bollman, J. L. (1938). **The Pathogenesis of Seminoma of the Testis. A Histologic Study in Dogs.**—*Surgery.* **3.** 904-911. 9 figs. [12 refs.] [Abst. in *Amer. J. Cancer.* **35.** 608, copied *verbatim*].

A study was made of 25 examples of spontaneous seminoma in dogs, of which

4 were found in cryptorchid testes. In 18 cases the tumors were in an early stage of development and had not begun to infiltrate, though they were unquestionably malignant, containing numerous mitotic figures. In these cases the origin of the tumor from multiple foci in the seminiferous tubules was apparent and the transition from the normal seminiferous tubule to those filled with malignant cells could be followed. The tumor cells could be traced from the spermatogenic series of cells, apparently the spermatocytes. Most of the testes in which the seminomas were present showed active spermatogenesis. There was, however, no formation of spermatids or spermatozoa in the cryptorchid testes. All the tumors were highly undifferentiated, of Broder's grade 4, but in only one had metastasis occurred.

Photomicrographs and a short bibliography are included.

I. Hueper, W. C., Wiley, F. H., Wolfe, H. D., Ranta, K. E., Leming, M. F., & Blood, F. R. (1938). **Experimental Production of Bladder Tumors in Dogs by Administration of Beta-naphthylamine.**—*J. industr. Hyg.* **20.** 46-84. 27 figs. [Numerous refs.] [Abst. in *Amer. J. Cancer.* **36.** 464, copied *verbatim*].

II. Hueper, W. C., Briggs, F. A., & Wolfe, H. D. (1938). **Experimental Investigation on the Etiology of Aniline Tumors.**—*Ibid.* 85-91. [8 refs.] [Abst. in *Amer. J. Cancer.* **36.** 464, copied *verbatim*].

I. Sixteen dogs were treated over a period of twenty to twenty-six months with betanaphthylamine, which is generally agreed to be involved in the production of aniline tumors in man. Betanaphthylamine was introduced by subcutaneous injections of an aqueous solution, beginning with 4 or 5 mg. daily, this dose being subsequently doubled and eventually tripled. Parenteral administration was supplemented by feeding. The animals stood the treatment well. Four untreated dogs served as controls. During the first twenty months of the experiment cystoscopic examinations were made every three months ; subsequently they were made at more frequent intervals.

In 13 of the 16 experimental dogs pathological changes developed in the bladder mucosa which were at no time seen in the control group. In 9 animals these changes were actually neoplastic ; in 4 instances they were of such a character as to be considered potentially neoplastic or pretumorous, though they were capable, also, of spontaneous regression.

Multiplicity of lesions was a striking characteristic of the majority of cases. The papillomatous structures were partly sessile, partly pedunculated. They sometimes had the appearance of edematous polyps, at other times they were warty or villous. Infiltrative growth seemed to occur in a few instances. The incidence of pathologic lesions of the bladder increased with the duration of exposure not only in the entire series, but also in individual animals. The first tumors were observed at twenty months.

The neoplastic lesions were of several histologic types ; papillary carcinomas, and nodular infiltrative carcinomas. The malignant lesions outnumbered the benign growths and all gradations were observed between pretumorous and neoplastic formations. The gross and histologic findings are given at length and numerous photomicrographs, clearly reproduced, accompany the discussion.

The predominant localization of the tumors in the dependent parts of the bladder, as well as the histologic findings, support strongly the urogenous origin of " aniline " tumors.

In addition to the bladder lesions the dogs receiving prolonged treatment with betanaphthylamine showed blood destruction, degenerative changes in the tubular epithelium of the kidneys and in the parenchyma of the liver, which also contained

adenomatoid, ill-defined foci of regenerated liver cells. There were no detectable changes in the pH of the blood or in its content of glutathione, glucose, calcium, cholesterol and phospholipid phosphorus.

A bibliography is appended.

II. In a further series of experiments Hueper and his associates sought to demonstrate chemospecific immune reactions in man, dogs, rats, and rabbits exposed for occupational or experimental reasons to aromatic amines with suspected carcinogenic properties. The rabbit sera were obtained following intravenous or intraperitoneal injection of beta-naphthylamine and in four instances following the injection of the urine of dogs treated for more than ten months with daily subcutaneous injections of that amine. The rat and dog sera were from animals injected subcutaneously with beta-naphthylamine hydrochloride and the human sera from aniline dye workers with bladder tumors. In no instances could an immunologic reaction be demonstrated by precipitin or complement-fixation reactions. Anaphylaxis tests and skin sensitization tests on guinea-pigs and rabbits were also negative, which is in accord with the observations of Landsteiner and Jacobs with dibenzanthracene and of Boyland and Warren with various carcinogenic hydrocarbons.

Rabbits injected daily in the peritoneal cavity with 3 mg. of beta-naphthylamine hydrochloride over a period of nine months did not develop any bladder tumors.

References are appended.

COLE, R. K. (1938). **Transmission of Avian Leucosis : A Note on Beach's Experiments.**—*Poult. Sci.* **17.** 417-418. 1 table. [3 refs.]

In a recent publication, BEACH [*V. B.* **8.** 253.] reported results of experiments, which he regarded as indicating failure to demonstrate the transmissibility of avian lymphomatosis by inoculation. C. applied X^2 tests to BEACH's figures and found that " there is little doubt but that he has demonstrated that transmission was accomplished ". [In fact, the figures do not demonstrate this at all ; but they do show that there was a significant difference in susceptibility between inoculated and control birds. Reference to BEACH's paper shows that, while the incidence of disease was higher in inoculated birds, there was a remarkable parallelism between these and control birds. It would seem therefore that, on these figures alone, BEACH's conclusion is the more reasonable].—F. W. PRIESTLEY.

ANON. (1940). **Symposium on Avian Lymphomatosis and Allied Diseases.**——*Poult. Sci.* **19.** 83-105.

This consists of papers by various authors which will be abstracted separately in the *Veterinary Bulletin.*

I. OBERLING, C., & GUÉRIN, M. (1938). Sur la production de tumeurs par inoculation intracutanée de virus leucémique de la poule. [**Formation of Tumours by Intradermal Inoculation of the Virus of Fowl Leucaemia**].—*C. R. Soc. Biol. Paris.* **129.** 1059-1060.

II. OBERLING, C., & GUÉRIN, M. (1938). Recherches sur l'immunisation par inoculation intracutanée du virus leucémique de la poule. [**Immunization by Intradermal Injection of the Virus of Fowl Leucaemia**].—*Ibid.* 1061-1062.

I. Having shown (1933) that injection (intramusc. or subcut.) of the virus of fowl leucaemia may cause a sarcomatous formation, involving connective tissue cells and histiocytes, with a lessened tendency to leucaemia, in about 4% of cases, the authors determined the effects of intradermal injection of this virus.

Large doses of infective blood (0·25 c.c. to 3 pullets and 0·5 c.c. to 5 pullets) caused death in 10-20 days with leucaemia which was associated with fusiform and myxomatous " leucaemic sarcoma " at the point of inoculation. The 0·25 c.c. dose frequently led to endothelial proliferation of an angiomatous type.

Medium doses (0·25 c.c. of a 1:4 dilution) of a weak virus were given to 3 pullets and of an active virus to 10 pullets. Of these 13 birds, 5 died within 15-40 days from leucaemia, one case being associated with a small tumour at the injection site. A small dose (0·1 c.c. of a 1:100 dilution) was given to 10 pullets. None developed leucaemia and one developed a small local fusiform sarcoma. Five other pullets were injected with a suspension of dried leucaemic blood (stored for 18 months) and 4 developed leucaemia without tumours.

Seven out of the above total of 36 pullets developed tumours, associated with leucaemia except in one case, this route of injection being five times more productive of tumour formation than intramuscular injection. The appearance of an extensive tumour of the thigh in one case is discussed and deemed due to another virus.

II. Thirteen pullets, which had resisted a leucaemic reaction to intradermal injection as described in I, were reinjected with a highly virulent strain of fowl leucaemia virus. Having resisted the medium dosage previously, 5 pullets withstood the reinjection, although one died of a diphtheritic disease in 14 days. The remaining 4 were reinfected and 2 died from leucaemia (at 25th and 36th day). Having resisted the small dosage previously, 7 out of 8 pullets died of leucaemia between the 8th and 28th days following reinjection.

An arbitrary comparison of immunity following various routes of injection (intraderm., intramusc. and intraven.) is then made. From this it appears that intradermal injection produced the greatest immunity, although such may be transitory.—C. V. Watkins.

I. Marchal, S., Paturel, L., & Guérin, P. (1939). Recherches sur la teneur en protides du sérum de poules inoculées avec une leucémie ou avec des sarcomes. [**Protein Content of Serum of Hens Inoculated with Leucaemia or Sarcoma**].—*C. R. Soc. Biol. Paris.* **131.** 213-216. 1 table. [6 refs.]

II. Marchal, S., Paturel, L., & Guérin, P. (1939). Etude sur le pourcentage des protides dans le sérum de poulets immunisés ou non contre la leucémie des poules. [**Percentage of Proteins in Serum of Chickens Immunized and Unimmunized against Leucaemia**].—*Ibid.* 216-218. 1 table. [1 ref.]

I. The authors used chickens inoculated with strain O.G. of fowl leucaemia and sarcomata T25 and T89, both transplantable tumours.

Some 20-60 chickens were inoculated with each of these tumours, and their average reactions were compared with those of 50 control chickens. In no inoculated group was excess globulin determined. Serum proteins varied in amount according to the tumour inoculated, but were reduced in those with all three tumours, especially in the chickens with the sarcomata. The serum albumin fraction was depressed and to the same extent in the three tumour groups, the lower total protein amounts in the two sarcoma groups being due to much reduced globulin fractions.

II. Grippin (1937) found that in chickens undergoing immunization there was an increase of total blood proteins. The present article compares the protein fractions of blood in normal and leucaemic birds, in non-immunized birds with and without leucaemia, and in immunized birds. Immunized birds were those which resisted two or more doses, the non-immunized group being those which developed leucaemia after dosage as described in I.

Greatest variations occurred in the immunized group. Total proteins averaged about 25% above normal, the serum albumin being almost normal, but the globulin fraction being increased about 52%. These variations were not constant however, and bore no relationship to the degree of immunity.—C. V. W.

NUTRITION IN RELATION TO DISEASE

ERDÖS, I. (1935). Adatok a juhok fertőző elvetéléséhez. [**Contagious Abortion in Sheep**].—*Állatorv. Lapok.* **58.** 74-76. 1 table.

E. described the occurrence of abortion in a flock of 475 pregnant ewes which had been fed mainly on wheat straw, the sheep being folded and getting no grazing.

345 ewes lambed in February and of these 60 (17·3%) aborted or gave birth to dead lambs and 68 gave birth to weak lambs which died within a few days. No micro-organisms could be incriminated and it was concluded that the disease was due to nutritional deficiency.

From February 24th onwards the ewes were fed on a diet consisting of hay, barley straw, swedes and a mixture of rye meal, barley meal and maize meal with calcium and a vitamin preparation added. In March, 123 ewes lambed. Of these, five ewes aborted or gave birth to dead lambs (4·06%) and 20 ewes gave birth to weak lambs which lived only a few days. In April, seven ewes lambed normally.

In the next lambing season 445 pregnant ewes were given the diet described above during the last four weeks of gestation. None aborted and of the 476 lambs born, only 18 (4·2%) died or were sacrificed before they reached the age of weaning.

—G. SÁLYI (BUDAPEST).

MARTIN, G. J. (1937). **Calcium Deficiency Syndrome Produced in Growing Animals.**—*Growth.* **1.** 175-181. 1 graph. [Numerous refs.] [Author's summary copied *verbatim*].

Dogs fed a diet low in calcium (containing 30 parts per million of calcium) maintain their serum calcium level with normal limits throughout the entire course of the deficiency. Despite this apparent normality of the serum calcium, the animals showed a characteristic syndrome terminating in tonic-clonic convulsions. Abnormalities in blood chemistry established the condition as unique.

GLOCK, G. E., MURRAY, M. M., & GLOVER, R. E. (1939). **Preliminary Observations on the Effects of a Low Calcium Diet on Goats and Kids.**—*J. comp. Path.* **52.** 229-248. 5 figs. on 1 plate, 3 tables, 5 graphs. [Numerous refs.]

Goats and kids, fed on a basal ration of flaked maize and bran with a minimum amount of hay, developed symptoms characterized by loss of weight and appetite with lameness, paresis and marked swelling of the jaws. The condition of the jaws and long bones of the animals resembled osteofibrosis. Serum Ca was very low, the inorganic P was higher than normal and the serum phosphatase values fluctuated greatly. Several animals died in low Ca tetany with serum Ca of approximately 5 mg. per 100 c.c. The state of tetany was relieved by the addition of either $CaCO_3$ or vitamin D concentrates, but the basal ration appeared to be deficient in both Ca and vitamin D, since abnormal bone changes were still evident in spite of vitamin D administration. Five of the six kids on the basal ration, with or without supplements of $CaCO_3$ or vitamin D, died or had to be killed ; the remaining kid which received both $CaCO_3$ and vitamin D survived for one year and was in good health.—R. ALLCROFT.

SCHOOP, G. (1939). Soll man Füchsen und Nerzen Kalkpräparate geben? [**Inadvisability of Giving Calcium Supplements to Foxes and Mink**].—*Dtsch. Pelztierz.* **14.** 332-334. 1 fig.

On a number of silver fox farms, pregnant and nursing vixens were subject to attacks of cramp and the bones of one vixen which died were soft and porotic. Their cubs were affected with rickets. S. attributes these conditions to the feeding of calcium (in addition to green or dried bone-meal) and states that large doses of vitamin D could not correct the ill-effects of the high Ca/P ratio thus produced. Bone-meal should be the only calcium supplement in the diets of foxes and mink.
—W. R. MUIR.

DUCKWORTH, J., GODDEN, W., & WARNOCK, Grace McM. (1940). **The Effects of Acute Magnesium Deficiency on Bone Formation in Rats.**—*Biochem. J.* **34.** 97-108. 1 fig., 4 tables. [17 refs.]

The purification and preparation are described of a diet deficient in Mg but adequate in respect of all other known dietary factors. Lister hooded rats and albino rats were used; all animals were weaned at 25 days of age and transferred to these experimental diets. About one-third of the skeletal Mg was lost from the skeleton during the first six days on the deficient diet. Among the animals surviving 11 days or less on the deficient diet, the differences in the total skeletal Mg bore no relation to the length of the survival period, but the two animals with the longest survival periods (16 days and 23 days) showed the lowest skeletal Mg. It is concluded that about one-third of the skeletal Mg can be easily mobilized, but whether the remainder can be mobilized in periods of longer survival is not yet clear. The experimental results show that the skeleton can, under conditions of acute Mg deficiency at least, function as a reserve of this element upon which the rat can make large demands. That this effect is reversible was shown by experiments in which Mg was restored to the diet.—R. ALLCROFT.

SWAMINATHAN, S. R. (1939). **Izuka's Test for Osteoporosis in Horses.**—*Indian vet. J.* **16.** 186-188. 2 figs. on 1 plate.

A special stylet is pressed steadily into bone over the frontal sinus to judge the hardness of the bone.—F. T. BOYLE.

LEITCH, I. (1939). **Sprouted Fodder and Germinated Grain in Stock Feeding.** —*Tech. Comm. Imp. Bur. Anim. Nutrit., Aberd.* No. 11. pp. 63. Numerous tables. [Numerous refs.] [1s.]

There is no evidence of any special value in sprouted fodder for milk production, growth of calves or pig fattening. Excellent results in fattening bullocks were obtained by replacing swedes with the dry weight equivalent of sprouted maize. There is no conclusive evidence that this kind of fodder has any beneficial action on the reproduction of farm mammals.

Germinated grain added to hens' rations without green food improves egg yield, fertility and hatchability; the latter is correlated with a decreased porosity of the shell, possibly through some effect on the Ca metabolism.—E. I. McD.

MEUNIER, P., & RAOUL, Y. (1938). La grandeur des besoins en vitamines des animaux en fonction de leur taille. [**Vitamin Requirements of Animals According to Their Size**].—*C. R. Soc. Biol. Paris.* **129.** 1078-1080. 1 fig., 1 table. [4 refs.]

Data relating to rats, g. pigs, and infant and adult human beings have been taken from the monograph of DANIELL and MUNSELL [(1937). *Misc. Publ. U.S.*

Dep. Agric. No. 275.] and from other sources, and have been utilized by the authors for the construction of exponential curves, the calculated minimal and optimal requirements of vitamins A, B_1, C and riboflavine being plotted against body weight. It is considered that the daily dose, v, of a vitamin which produces analogous effects upon animals under comparison, may be expressed as a function of the body weight according to the formula :–

$$v = KM^{\alpha},$$

where K is a constant which is specific for each vitamin, M is the weight of the animal, and α is a fraction which may be taken as 2/3 for all practical purposes.

—ALASTAIR N. WORDEN.

MOORE, L. A. (1939). **Carotene Intake, Level of Blood Plasma Carotene, and the Development of Papillary Edema and Nyctalopia in Calves.**—*J. Dairy Sci.* **22.** 803-812. 10 graphs. [9 refs.]

When placed on rations of low carotene content at the age of 40-90 days, Holstein and Ayrshire male calves developed nyctalopia in 48-73 days and papillary oedema usually at about the same time. These conditions could be expected when the plasma carotene fell below 0·13γ per ml. An intake of 16γ carotene per lb. body weight just prevented nyctalopia, but was not quite sufficient to clear up papillary oedema. Calves receiving 30γ carotene per lb. body weight appeared thrifty and active and the plasma carotene reached 0·7γ per ml., but this was still considerably below the level of 3γ per ml. recorded for the control calf on a liberal carotene intake. The results are considered to show that the minimum carotene requirements of bovines as stated by GUILBERT and HART [*V. B.* **9.** 575.] are approximately correct, when prevention of nyctalopia is taken as the criterion.

—W. R. MUIR.

AXELROD, A. E., MADDEN, R. J., & ELVEHJEM, C. A. (1939). **The Effect of a Nicotinic Acid Deficiency Upon the Coenzyme I Content of Animal Tissues.** —*J. biol. Chem.* **131.** 85-93. 1 fig., 2 tables. [16 refs.]

Experiments on six dogs and four pigs demonstrated that a nicotinic acid deficiency resulted in a lowered coenzyme I content of the liver and muscle. The extent to which the coenzyme I content was affected varied considerably and may be considered to be a function of the degree of deficiency, but at present no positive correlations can be made. No effect was noted on the coenzyme I content of the brain, kidney cortex and blood and it is assumed that the normal level of coenzyme I in these tissues is absolutely essential to life.

To determine whether the coenzyme I content of tissues could be increased beyond the normal value by the administration of excessive amounts of nicotinic acid, three rats were given daily 1 mg. of nicotinic acid per kg. of live weight for two to three weeks. No increase was found in the liver, brain, kidney cortex or muscle of the rats when compared with similar tissues of three normal rats.—R. A.

KNOOP, C. E., KRAUSS, W. E., & HAYDEN, C. C. (1939). **Magnesium and Vitamin D Relationships in Calves Fed Mineralized Milk.**—*J. Dairy Sci.* **22.** 283-289. 1 fig., 4 tables. [15 refs.]

Three calves (group 1) fed a basal ration containing a limited amount of winter milk plus iron and copper salts were compared with three calves (group 2) fed a like ration supplemented with magnesium carbonate, and with three calves (group 3) fed the basal ration supplemented with magnesium carbonate and irradiated by ultra-violet light. The amount of magnesium carbonate added was equivalent to 1% of the dry matter content of the milk fed. After 120-150 days

the calves in groups 1 and 2 showed a tendency to stand on their toes, with their heads in a lowered position and backs slightly arched. Blood analyses showed that serum-magnesium values for the calves in group 1 decreased rapidly as the experiment continued and after 120 days were below 2·0 mg., whereas in groups 2 and 3 the magnesium content of the serum was maintained at a normal level. In groups 1 and 2 the blood-calcium levels were low enough to suggest low-calcium rickets. Bone measurements made at the conclusion of the experiment, when calves were 255 days old, showed that the leg bones of group 3 were heavier and denser than those of the other groups, this presumably being due to the effect of the ultra-violet light. Bone magnesium in groups 2 and 3 was 36% higher than that in group 1 (basal ration). It is suggested that all calves in this latter group would have died in convulsions if they had been kept on the basal ration for a period much longer than 255 days.—N. J. SCORGIE.

SIEGEL, L., ALLEN, R. M., MCGUIRE, G., & FALK, K. G. (1939). **A Study of Normal and Rachitic Bone Structure by Microphotographic Methods.**—*Amer. J. Path.* **15.** 273-277. 11 figs. on 4 plates. [6 refs.]

A comparative photomicrographic study of unstained sections of normal, rachitic and partially healed (2 plus) rachitic bones (femurs) of rats was made by the use of normal, ultra-violet and infra-red radiation. The femurs were first embedded in collodion and then cut in sections 25μ thick. The sections were mounted in glycerin under fused quartz coverslips on fused quarts slides; the objective, eyepiece and substage prism of the microscope were also of quartz, since ultra-violet light, to which ordinary glass is opaque, was one of the forms of radiation used. An open automatic arc was used as the source of light in all the illustrations. To ensure negatives of comparable density, the exposures were worked out by the multiplication method. Greater wealth of detail and better and sharper definition of all detail in the epiphyseal layers were obtained in the photomicrographs made by infra-red radiation than by the normal or ultra-violet radiations.—R. ALLCROFT.

CORRELL, J. T., & WISE, E. C. (1938). **Studies on the Relative Efficiency of Vitamin D from Several Sources. I. Influence of Vitamin D of Different Origins on Bone Ash and Body Weight of the Chicken. II. Influence of Vitamin D of Different Origins on the Serum Phosphatase of the Chicken.** —*J. biol. Chem.* **126.** 573-579 and 581-588. 1 fig., 5 tables. [Num. refs.]

I. Commercial samples of tuna-liver oil were assayed with rats by the standard U.S.P. XI method. They were then tested on groups of from 12-15 single comb White Leghorn chicks by the bone-ash method, and were found to possess, rat unit for rat unit, between 40 and 60% the efficiency of cod-liver oil. In a further series of experiments, the tuna- and cod-liver oils were fed to comparable groups of chicks from one day to eight weeks of age; birds receiving either oil grew better than negative controls, indicating that vitamin D has a growth-promoting activity for the chick, even in the presence of a diet containing all other known vitamins, but again the cod-liver oil groups were superior.

II. By the method of BODANSKY [(1933). *J. biol. Chem.* **101.** 93.] the phosphatase concentration of the serum of two-day-old chicks was determined, and found to be about 80 " Bodansky units " per 100 c.c. That of normal adult human beings was found by Bodansky to lie between 1·5 and 4·0 units, and the few observations upon adult fowls indicate a normal value of about 20 units per 100 c.c. Groups of chicks comparable to those used in I were then provided with basal diets adequate in all respects other than vitamin D, and supplements of either cod- or tuna-liver oil were given to different groups. At 21 days of age, the

average serum phosphatase concentration per 100 c.c. was found to be 47 units in the cod-liver oil group and 81 units in the tuna-oil group ; negative controls showed values of over 230 units. Further experiments with chickens from the 8th to 13th week of life confirmed the discrepancies between the oils, although both were superior to irradiated ergosterol in reducing the phosphatase values.

About 18 I.U. of vitamin D from cod-liver oil per 100 g. diet were found to be the minimum effective level for ensuring a normal serum phosphatase, a value which is said to correspond with that necessary to ensure normal bone development in the chick.—ALASTAIR N. WORDEN.

BICKNELL, F. (1940). **Vitamin E in the Treatment of Muscular Dystrophies and Nervous Diseases.**—*Lancet.* **238.** 10-13. [13 refs.]

The laboratory work of EINARSON and RINGSTED [*V. B.* **8.** 800.] is discussed and the reasons are given for their suggestion that the muscular dystrophies, amyotrophic lateral sclerosis, and tabes dorsalis are deficiency diseases due to lack of vitamin E. Twenty-six cases were treated with half-an-ounce of fresh dried whole-wheat germ twice daily for varying periods, in one case up to 18 months. The clinical results support the contention that the muscular dystrophies and amyotrophic lateral sclerosis are deficiency diseases and are curable.—R. ALLCROFT.

I. MACCORQUORDALE, D. W., MCKEE, R. W., BINKLEY, S. B., CHENEY, L. C., HOLCOMB, W. F., THAYER, S. A., & DOISY, E. A. (1939). **Identification of Vitamin K_1. (Alfalfa). [Correspondence].**—*J. biol. chem.* **130.** 433.

II. ALMQUIST, H. J., & KLOSE, A. A. (1939). **Antihemorrhagic Activity of 2-methyl-1, 4-naphthoquinone. [Correspondence].**—*Ibid.* 787-789. 1 table. [5 refs.]

III. ALMQUIST, H. J., & KLOSE, A. A. (1939). **A Derivative of Vitamin K_1. [Correspondence].**—*Ibid.* 791-793. [9 refs.]

I. Evidence from the process of synthesis indicated quite clearly that vitamin K_1 is 2-methyl-3 phytyl-1, 4-naphthoquinone, $C_{31}H_{46}O_2$. The bio-assay of the diacetyldihydro derivations of natural and synthetic vitamin K_1 gave identical results. The potency of each was 660 units per g.

II. The results of experiments indicated that 2-methyl-1, 4-naphthoquinone may be lost from the diet when added as a solution in ethanol, in Wesson oil, in cod liver oil, in methyl laurate and in mineral oil. To avoid these losses of activity, chicks were given daily doses orally and the determinations of the prothrombin time at the end of the assays showed that vitamin K_1 has less activity than its equivalent content of 2-methyl-1, 4-naphthoquinone. In terms of the reference standard the activity of the vitamin K_1 was 63,000 while that of the 2-methyl-1, 4-naphthoquinone was approximately 240,000.

III. During studies on the alkaline hydrolysis of vitamin K_1 an oily, pigmented, acidic substance was obtained which was yellow in solution as the acid and reddish brown in the form of the ion. The process of isolation of this substance is described and the entirely provisional formula $C_{31}H_{50}O_4$ assigned to it.—R. ALLCROFT.

STOKSTAD, E. L. R., & MANNING, P. D. V. (1938). **Evidence of a New Growth Factor Required by Chicks.**—*J. biol. Chem.* **125.** 687-696. 1 fig., 5 tables. [7 refs.] [See also *V. B.* **8.** 802].

The experiments indicate that chicks require a dietary factor for growth which cannot be identified with vitamins A, D or K, thiamine, riboflavine, filtrate factor, B_4, or the anti-encephalomalacia factor. This growth factor is present in large

amounts in alfalfa, middlings, wheat, bran and yeast, to a lesser extent in corn, and in very small amounts in polished rice. Details of the solubility and stability of the factor are given.—R. ALLCROFT.

PUBLIC HEALTH

PORTSCHY, Ö. (1938). A kecsketej csíratartalma. [**Bacterial Content of Goat's Milk**].—*Thesis, Budapest.* pp. 13. [Numerous refs.] [German summary].

Samples of goats' milk, originating from nine goats kept under widely differing hygienic conditions in various parts of the country, were examined with a view to establishing their bacterial content. The samples were classed A, B and C, A representing good, B fair and C bad hygienic conditions. Three samples of each category were examined in summer and in winter 2, 5, 8, 24 and 48 hours after milking, the samples for seasonal comparison being obtained from the same animals. P. took the samples himself. Figures are given for fore-milk, mid-milk and strippings. The following table gives the counts for whole milk :–

Hours After Milking.	Category A.		Category B.		Category C.	
	Total No. of Organisms.	*Bacterium coli.*	Total No. of Organisms.	*Bacterium coli.*	Total No. of Organisms.	*Bacterium coli.*
			Winter.			
2	12,800	73	71,500	3,700	524,000	24,000
5	11,830	54	78,000	4,500	$1,747 \times 10^3$	17,500
8	21,700	53	226,000	32,500	325×10^4	31,800
24	2×10^6	500	68×10^5	51,000	204×10^6	160,000
48	16×10^8	100	267×10^8	730	36×10^9	36,000
			Summer.			
2	99,000	2,300	327,000	7,700	220,000	5,320
5	97,000	4,450	747,000	10,600	473,000	8,200
8	132,000	6,450	847,000	164,500	16×10^5	10,600
24	294×10^5	593,000	533×10^6	14×10^5	172×10^6	850,000
48	315×10^8	17,300	23×10^9	17×10^5	453×10^8	417,000

No explanation is offered for the fact that summer figures for category C are considerably lower than winter figures, except for the 48-hour samples.—E. M.

WHITE, E. G., & ELLIS, A. A. B. (1939). **Causes of Condemnation by Meat Inspectors of Fowls of the "Old Hen" Class.**—*Vet. Rec.* **51.** 475-478. 1 fig., 2 tables. [15 refs.]

This article is an analysis of the diseases responsible for condemnation of 250 fowls, of average age one to two years, at Smithfield Market, London, during April-June, 1938 and January-February, 1939. The method of carrying out the autopsies and the comparative thoroughness of examination are indicated. A naked eye examination was made of the internal organs. The intestines were not opened in all cases and the bone-marrow of the femora only was examined for evidence of TB.

The incidence is noted of TB. of the thymus; this gland was affected in 20% of cases of generalized TB.

In the 250 fowls there were 145 cases of TB. The method used was that of a small incision through the abdominal wall behind the left wing exposing the liver to view. It is claimed that the results of the examination (in the liver inspection, the incidence of liver lesions was 100% in case of fowls with any tuberculous lesions) afford a clear indication of the efficacy of the method. Many tuberculous birds were well-nourished.

The condition known as "fatty liver", more commonly encountered in fowls originating from Eire, is described and its differential diagnosis from TB. indicated.

Notes are given on adeno-carcinoma of the ovary, on neoplasms other than those of the oviduct, on neurolymphomatosis and leukaemia, on cysts of the right oviduct, and on ovarian infection.

The need for uniform inspection of fowl carcasses throughout the country is discussed.—H. BURROW.

HAINES, R. B. (1939). **Microbiology in the Preservation of the Hen's Egg.**—*Spec. Rep. Food Invest. Bd, Lond.* No. 47. pp. 65. 5 figs., 3 plates, 8 tables. [Numerous refs.]

Part 1 of the report describes the anatomy and physiology of ovideposition and discusses the possibilities of bacterial invasion. Infection of the oviduct may occur at the top from diseased ovaries or at the bottom from the cloaca when there is digestive disturbance.

In Part 2 the structure of the egg and shell are described and the findings of numerous workers regarding the bacterial content of the egg are recorded. Infection is mostly derived from external sources and is not genital. Organisms which can cause spoilage are already present in the shell which carries on an average 200-500 mould spores per egg. Factors which may be recognized in the defence of the egg against microbial infection are the protection afforded by the outer coat of mucin on the shell, the mechanical protection of the shell and its associated membranes, the presence of anti-bacterial substances in the egg-white and its pH effect, and the unavailability of native proteins for bacterial nutrition. Three anti-bacterial effects of egg-white have been demonstrated, these being (1) unfavourable pH, (2) some thermolabile substance, notably anti-bacterial against *B. subtilis*, and (3) that due to lysozyme.

In Part 3 the various conditions met with in eggs during storage are dealt with. In English eggs and eggs imported into this country three definite types of rot are distinguished, *i.e.* red rot and green rot caused by *Pseudomonas* spp. and black rot caused by *Proteus* sp. Green rot is the most common.—F. T. BOYLE.

THERAPEUTICS

SHANKS, P. L. (1939). **Treatment of Influenzal Arthritis in Pigs with M & B 693.** —*Vet. J.* **95.** 429-432.

This is a record of the successful use of M & B 693 and of soluseptasine in the treatment of arthritis, associated with an organism resembling *Haemophilus influenzae*. Affected pigs have swollen, painful joints and a high temperature. Several animals were given 30 c.c. of 20% soluseptasine and recovered completely within 24 hours. The pigs treated varied in age.

M & B 693 was then tried and found to be equally effective. In some cases a single dose was given and in others three doses were given at intervals in the course of one day.—W. J. IRONSIDE.

I. GAY, F. P., & CLARK, A. R. (1937). **On The Mode of Action of Sulfanilamide in Experimental Streptococcus Empyema.**—*J. exp. Med.* **66.** 535-547. 2 tables. [12 refs.]

II. GAY, F. P., CLARK, Ada R., STREET, Julia A., & MILES, Dorothy W. (1939). **The Mode of Action of Sulfanilamide on Streptococcus. II.**—*Ibid.* **69.** 607-624. 1 table. [Numerous refs.]

III. SHAFFER, P. A. (1939). **The Mode of Action of Sulfanilamide.**—*Science.* **89.** 547-550. [5 refs.]

I. Sulphanilamide, injected subcutaneously in doses of 1·2 g. per day, prevented the evolution of a fatal streptococcal empyema in rabbits. Complete sterilization of the infected cavity occurred on the second day. The serum, defibrinated blood and pleural exudate of similarly treated animals inhibited the growth *in vitro* of the same *Streptococcus*, but failed to sterilize the culture. The organisms grown in such drugged serum developed abnormal forms, but lost little, if any, of their virulence. Co-operation on the part of locally derived clasmatocytes was apparently required in complete sterilization of the animal body, and a precocious and increasing mobilization of clasmatocytes in the parietal and visceral pleura of treated animals could be demonstrated. There was no evidence that the cell reaction which finally accounts for the disposal of the organisms was other than local.

II. Addition of sulphanilamide to streptococci *in vitro* usually causes bacteriostasis and not complete destruction of even small numbers of bacteria, provided the medium is a favourable one for the growth of the micro-organisms. The drug does not impair the virulence of the organism. It causes a temporary inhibition of hemotoxin formation, but does not neutralize hemotoxin already formed. No significant effect of sulphanilamide on the formation of leucocidin or fibrinolysin by streptococci has been demonstrated. Unlike certain other chemotherapeutic drugs, *e.g.* acriflavine and gentian violet, sulphanilamide is not diminished at all by contact *in vitro* with large masses of streptococci, nor does the action of the drug render the micro-organisms more capable than untreated cocci to adsorb gentian violet or acriflavine, or to be destroyed by these bactericidal substances.

III. It is suggested that sulphanilamide and sulphapyridine are not themselves bactericidal, and that their therapeutic and toxic effects are due to oxidation products of these substances, formed by atmospheric oxygen under the catalytic influence of respiring tissues or organisms. There is evidence that both drugs are readily oxidized to characteristic cherry-reddish products by a number of oxidizing agents as well as by electrolytic oxidation; the primary end product of oxidation is said to be nitroso-benzene sulphonamide. The oxidation products are highly reactive and are quickly reduced by a number of substances. The drugs

thus provide a mechanism by which the sterilizing oxidation intensity of molecular oxygen is applied nearly at its maximum to bacteria (and, of course, to the host cells). The relation of these ideas to the search for new chemotherapeutic substances is briefly discussed.—J. M. ROBSON.

OAG, R. K. (1939). **The Effect of P-Amino-Benzene-Sulphonamide Upon Various Bacteria *in vitro* and *in vivo*.**—*Edinb. med. J.* **46.** 542-555. [Num. refs.]

A method for estimating quantitatively the bacteriostatic activity of sulphanilamide against various organisms is described. *In vitro*, sulphanilamide has an inhibitory effect on haemolytic streptococci and on meningococci, and this is paralleled by a protective action in mice injected with these organisms, and also clinically in the human subject. Staphylococci, *Bacillus anthracis*, and *Pasteurella boviseptica* are unaffected *in vitro* and in animals; staphylococcal infections are clinically unresponsive. The evidence shows the value of the *in vitro* and *in vivo* tests in forecasting the probable effect of sulphanilamide on bacterial disease in man.—J. M. ROBSON.

I. KLEEBERG, J., GUREVITCH, I., & ALKAN, W. J. (1939). **Sulphanilamide Therapy in Undulant Fever and a New Method of Blood Culture.**—*Trans. R. Soc. trop. Med. Hyg.* **33.** 183-189. 1 graph. [18 refs.]

II. DURAND, P. (1939). Essais sur le pouvoir protecteur du Dagénan dans l'infection à Br. melitensis de la souris. [**Protective Power of Dagenan (M & B 693) in *Br. melitensis* Infection of the Mouse**].—*Arch. Inst. Pasteur Tunis.* **28.** 107-112. 1 table. [3 refs.]

I. The authors describe a culture method on a medium of glycerin, phosphate, cystine, and agar on which positive cultures were repeatedly obtained from nine out of eleven cases of undulant fever.

Treatment of these cases with sulphanilamide derivatives (deseptyl, albosal, prontosil) appeared to affect the bacteraemia in six cases, but no influence on the clinical picture was observed.

II. The organism was recovered from the spleen in 12 out of 17 infected mice treated with M & B 693 and in 14 out of 16 untreated controls. It was also recovered in 60% of mice treated over a longer period of time. [Number in group not given].—J. M. ROBSON.

I. HAWKING, F. (1938). **A Quantitative Study of the Photosensitivity Induced in Trypanosomes by Acriflavine.**—*Ann. trop. Med. Parasit.* **32.** 367-381. 4 figs., 3 tables. [8 refs.]

II. HAWKING, F. (1938). **A Note on the Trypanocidal Action of Atebrin in Relation to its Absorption by Trypanosomes.**—*Ibid.* 383-386. 2 tables. [6 refs.]

H. describes a method of measuring the quantity of acriflavine in trypanosomes, or in the medium in which they are in contact with the drug, by the photosensitivity of the trypanosomes. When trypanosomes treated with acriflavine are exposed to a strong light (in these experiments, a pointolite lamp with a glass condenser) their movements diminish and finally cease. The degree of photosensitiveness of the trypanosomes can be measured on the stage of the dark ground microscope by the period of illumination required to cause immobilization. Equations are given for the relation between the photosensitivity of the trypanosomes and the initial concentration of the acriflavine in the medium, and for the relation between the photosensitivity and the acriflavine concentration of the trypanosomes.

II. An investigation into the quantity of atebrin absorbed by trypanosomes is described. The amount absorbed was measured by extraction of the treated trypanosomes in alcohol, and by a comparison of the colour of the extract with known concentrations of the drug in alcoholic solution. It was found that atebrin was only absorbed to a very small extent and that its trypanocidal power *in vitro* could be exerted only in high concentration. Compared with acriflavine the amount absorbed was only in the proportion of 1:400. *In vivo* atebrin was not absorbed by trypanosomes to such an extent as to be trypanocidal, probably because its toxicity prevented its maintenance in the blood in sufficiently high concentration.
—U. F. RICHARDSON.

PEARCE, Louise. (1939). **Tryparsamide in the Control of African Sleeping Sickness.** —*Science.* **90.** 39-40. [8 refs.]

It is claimed that tryparsamide has a special value in the treatment of human sleeping sickness because of its action on cases in which the cerebrospinal fluid has been invaded. This condition is now known to occur much earlier than was previously supposed.—U. F. RICHARDSON.

BUSHLAND, R. C. (1939). **Volatile Oils as Ovicides for the Screwworm,** *Cochliomyia americana* **C. & P.**—*J. econ. Ent.* **32.** 430-431. 1 table. [2 refs.]

The eggs of *C. americana* all failed to hatch after they had been momentarily immersed in any of the following oils :– anise, bitter almond, cassia, fennel seed, mustard, parsley, penny-royal, rue, sassafras or sweet birch. Oils of caraway seed, clove and lemon grass did not prevent hatching of eggs which were treated within two hours of hatching, but caused the larvae to die immediately after hatching. Eggs less than three hours old were more easily killed than older eggs.—W. MOORE.

ANON. (1939). **Heartworm Infestation of Dogs.**—*Science.* **90.** Suppl. Sept. 29th. pp. 8-9.

A new drug, antimonial-III catechol thiosalicylic acid sodium, has been used in the treatment of *Dirofilaria immitis* infection in the dog. It is given intravenously in a series of graduated daily doses, and kills the adult worms in the right heart by building up a concentration of trivalent antimony in the blood stream. The dead filariae appear to be absorbed by the lungs.—M. L. BINGHAM.

SCORGIE, N. J. (1939). **The Treatment of Sterility in the Bitch by the Use of Gonadotropic Hormones.**—*Vet. Rec.* **51.** 265-268. 1 fig., 1 table. [3 refs.]

A series comprising 18 animals was subjected to treatment with very successful results. The type of case in which the treatment is indicated is described as that in which there is functional disturbance of the endocrine system and in which the most usual manifestation is the prolonged absence of oestrus.

The treatment applied consisted, in the majority of cases, in the simultaneous injection of two preparations of the anterior pituitary :– (1) "Antostab ", containing the follicle stimulating hormone and (2) " Physostab ", containing the luteinizing hormone. Although various breeds were represented, the same doses were administered in all cases. All the animals except two developed oestrus after treatment and, except in two cases, oestrus commenced within a week. Of the animals which developed oestrus 13 were mated and nine conceived, eight of which had whelped at the time the article was written.—W. J. IRONSIDE.

DRYERRE, H. (1939). **The Effect of Prolan upon Fertility in the Silver Fox.**— *J. Physiol.* **96.** 35P-36P.

Thirty rat units of prolan (Bayer) were injected into each of 201 vixens; 235 vixens of comparable age and breeding history were kept as controls. The vixens

in the treated group had a cub yield of 550 and the controls produced only 477 cubs. Analysis of the results revealed that this increased cub yield was due not to an increase in the size of the litters, but to the fact that the injected animals showed a larger percentage of fertile matings than did those in the control group. When the numbers of litters for the different age groups were compared, it was found that the beneficial effects of the prolan injections were confined to the young primiparous vixens. The percentage whelping in these vixens was 52% in the treated group, and 29% in the control group.—N. J. SCORGIE.

WOOLDRIDGE, W. R. (1938). **Cod Liver Oil and Animal Nutrition.**—*Vet. Rec.* **51.** 249-251. 1 fig., 3 tables.

This is an outline of the characters, properties, preparation and standardization of cod-liver oil of good quality. Mention is made of factors which lower the quality, and tables are included to show the effect of the oil on poultry and pigs. Steps noted in preparation include those taken on board ship and in the factory. —W. J. IRONSIDE.

I. BOTTOMLEY, A. C., FOLLEY, S. J., WALKER, F. H. A., & WATSON, H. M. S. (1939). **Effect of Subcutaneous Implantations of Adrenalin Tablets on Blood-Sugar and Milk Composition in Lactating Ruminants.**—*J. Endocrinol.* **1.** 287-299. 7 figs. [19 refs.]

II. BOTTOMLEY, A. C., FOLLEY, S. J., & WALKER, F. H. A. (1939). **Induction of Prolonged Hyperglycaemia in the Lactating Ruminant by Subcutaneous Implantation of Adrenalin Tablets.**—*Chem. Ind.* **58.** 470.

I. The authors draw attention to a new method of administration of hormones by the subcutaneous implantation of tablets. Implantation of 150 mg. adrenalin in goats and 500 mg. in a cow resulted in a great increase in blood sugar after 24 hours; after 48 hours it was falling but had not reached its original level. There were also coincident increases in blood lactic acid and milk lactose percentage, the latter being probably due to a fall in the milk yield. It is recorded that the arterial blood lactic acid in the normal lactating goat ranged from 5·4-15·0 mg.%.

II. A short note covering the same ground as I. No experimental data are given.—N. J. SCORGIE.

POISONS AND POISONING

PEIRCE, A. W. (1939). **Chronic Fluorine Intoxication in Domestic Animals.**—*Nutr. Abstr. Rev.* **9.** 253-261. [Numerous refs.]

This review on chronic F intoxication is divided into observations of the disease as it occurs (1) naturally, *e.g.* "gaddur" in Iceland and "darmous" in Morocco, due to high F content of the soil, herbage or water derived from natural sources; (2) due to the animals grazing in areas around industrial concerns, *e.g.* factories employing F compounds such as cryolite and superphosphate, and (3) due to experimentally induced poisoning. Symptoms of the disease include dental changes ("mottling" of the teeth), emaciation, weakness, lameness and impaired locomotion associated with the development of exostoses on the long bones and the mandible. Experimental observations have been reported in sheep, cattle, goats, pigs and poultry. Young animals grow less rapidly and show general unthriftiness with marked chemical and pathological changes in the bones and the teeth. The normal F content of tissues, reported to be of the order 5-10 p.p.m., is said to be increased under conditions of chronic F poisoning. Various changes

in blood constituents and mineral metabolism have been reported, although in many cases these findings have not been confirmed. The severity of chronic intoxication depends upon the species and age of the animal, as well as upon the nature of the F compound involved, and the duration and mode of administration. There is no evidence that F plays any definite physiological role in the body but one of the most important practical aspects of F is the degree to which it occurs in phosphate supplements fed to domesticated animals since all natural deposits of phosphates contain F. Geological evidence shows that the older the deposits the higher the F content. Various authors have recommended large scale calcination of rock phosphate by steam, by which F is almost entirely removed or reduced to a harmless level, but this is not always economic in practice. In industrial areas where the intoxication is due to contamination of the atmosphere, water and grazing by volatile F compounds, control of the factory emanations, dust and liquid affluent will remove the trouble, but in areas permeated with F (such as Morocco) it is impracticable to control chronic fluorosis. For fuller details of this review the original should be consulted together with the extensive bibliography.—A. E.

COUCH, J. F., & BUNYEA, H. (1939). **Toxicity of Potassium Cyanide for Swine.** —*Vet. Med.* **34.** 620-623. 3 tables.

The toxicity of KCN for swine was determined by administration of known doses in aqueous solution. Symptoms included increased rate of respiration, flushed skin and incoordination of limbs, followed by more intense respiratory changes, coma and death at which cyanosis was marked. Most animals salivated and in 48 of 81 cases emesis occurred in periods of from four minutes to an hour after dosage. Symptoms appeared less rapidly in pigs than in ruminants and spontaneous recovery was observed in some cases in which the animals were apparently moribund. The M.L.D., where there was no emesis, ranged from 2·4 to 3·4 mg. KCN per kg. live weight, although eight animals survived much higher doses. Toxic effects were obtained with a dose of 0·65 mg. per kg. and severe symptoms with doses of 0·86-1·9 mg. per kg., while the smallest emetic dose was 0·84 mg. per kg. The slowness in appearance of symptoms combined with the ease with which the pig can empty its stomach is suggested as an explanation for the relative immunity of this species to spontaneous poisoning from cyanogenetic plants. There was no indication of the establishment of a tolerance or of increased susceptibility.—ALFRED EDEN.

GUTIERREZ, H. P. (1937). El sorgo de alepo como planta toxica. [**Sorghum Poisoning**].—*An. Soc. rur. argent.* **71.** 235-236. [2 refs.]

The growth, dissemination, and distribution of Aleppo sorghum are described [see also *V. B.* **7.** 642.]. G. states that the amount of dhurrin present is in direct relation to the richness of the soil, and quotes PIEDALLU (1923.) that the maximum toxicity of sorghum is present when the plant is 5-10 cm. in height, gradually declining to nil at 1·5 metres high.

The use of sodium picrate papers in determining the presence of HCN in sorghum samples is given.—J. PASFIELD.

DEEM, A. W. (1939). **Scum on Pond in Wild County Proved Lethal. Blue-Green Algae Shown to Be Poisonous ; Dangerous to Livestock and Poultry.**—*Col. Farm Bull.* **1.** No. 4. 18-19.

A brief note in which blue-green pond algae (species unnamed) are reported to have caused fatal poisoning of ducks, wild birds, fish, snakes and salamanders living on or in the pond. There was also a possibility that drinking of the pond

water caused the death of a calf and illness in a horse. The circumstances in which the poisoning arose suggested that it was possibly due to a continuous wind from one direction concentrating the algae at the shallow end of the pond. No lesions were found at P.M. examination of dead animals. A small quantity of the algae killed chickens and g. pigs in five to ten minutes when given *per os*. It is suggested that blue-green algae, which commonly grow in stagnant pond water, are a potential danger to livestock.—N. J. SCORGIE.

DITMARS, R. L. (1939). **Snake Bites Among Domestic Animals.**—*J. Amer. vet. med. Ass.* **94.** 383-388. 5 figs.

Four main types of snake inhabit North America. In three of these the venom is haemotoxic and in the fourth neurotoxic. In all cases the venom tends to remain localized for several hours after the bite and some may remain for several days. The danger in snake bite is dependent upon the body size, and the larger this size the less is the danger.

Treatment consists in the removal of as much venom as possible by cupping, and in the use of serum. A bitten animal should not be given exercise or any stimulant; cauterization is harmful as also is the use of strong solutions of potassium permanganate. The possibility of clostridium infection having been introduced should be kept in mind as severe cases of *Cl. welchi* and *Cl. tetani* infection have occurred in animals bitten by snakes.—W. J. IRONSIDE.

PHYSIOLOGY

CORBIN, K. B., & HINSEY, J. C. (1939). **Influence of the Nervous System on Bone and Joints.**—*Anat. Rec.* **75.** 307-317. 1 table. [Numerous refs.] [Authors' summary copied *verbatim*].

In 13 cats the skeletal parts of one hind limb were completely denervated for periods of from 2 weeks to 3½ years following lumbar sympathectomy and section of L4-S3 dorsal roots. In each of two cats the lumbar sympathetic chain was removed unilaterally without deafferentation. Roentgenologic, gravimetric, macroscopic and microscopic studies were then made of the denervated and normally innervated bones and joints.

No changes were seen in bones and joints completely denervated (deafferented and sympathectomized) for as long as 3 years in those animals whose movements were restricted by confinement in standard small animal cages. In cats which ran free in a large outdoor cage, constant trauma of the anesthetic hip joint, used considerably and in an abnormal fashion resulted in an attrition arthritis with concomitant sclerosis of the subarticular cancellous bone. The other denervated bones and joints in the latter animals showed no alterations from the normal.

Because the structure of the skeletal parts may be maintained in a normal condition for over 3 years following complete denervation, we conclude that bone and joints are not supplied with nerves having a specific trophic function. Deafferentation results in a loss of the protection afforded by the proprioceptive mechanism and, therefore, may lead to attrition arthritides in those joints subject to constant trauma.

LAMOREUX, W. F., & HUTT, F. B. (1939). **Variability of Body Temperature in the Normal Chick.**—*Poult. Sci.* **18.** 70-75. 3 figs., 1 table. [10 refs.]

This article affords information on possible sources of error in determining the temperatures in normal chicks, and stresses the necessity for a standardized

technique in the process of temperature recording. The body temperature rises most rapidly during the first four days after hatching. There appears to be no consistent relationship between body temperature and sex, or between body temperature and body weight. Normal temperature variation in relation to breed was also determined, using White Leghorns and Rhode Island Reds. Statistically significant differences in temperatures between these breeds were noted at seven and ten days of age.—S. G. Iyer.

Lemberg, R. (1938). **Animal Pigments.**—*Ann. Rev. Biochem.* **7.** 421-448. [Numerous refs.]

A review of recent work, primarily of biochemical interest, dealing with porphyrins, haematin compounds, bile pigments, haemocyanins, carotenoids, flavines, pterins and miscellaneous compounds such as vitamin P now recognized as a mixture of two flavanone glucosides. Of more general interest to veterinarians are references to the following associated biological conditions :– " ochronosis " of cattle—a hereditary disease similar to human chronic porphyria—physiological porphyria of the fox squirrel, differences in haemoglobins of different animals and the existence of specific differences between foetal and adult haemoglobins, species-specificity of myoglobins of different animals, the erythrocruorins or invertebrate analogues of haemoglobin, the nature of catalase as a ferric protohaematin protein and of peroxidase as a protein-haematin compound, cytochromes in bacteria, the linkage of both " direct " and " indirect " bilirubin with serum albumin, the evidence that " visual purple " is a carotenoid albumin re-synthesized in the eye from vitamin A, and the suggestion that pterins play a part in erythrocyte formation.
—H. H. Green.

Michel, H. O., & Harris, J. S. (1940). **The Blood Pigments. The Properties and Quantitative Determination with Special Reference to the Spectrophotometric Methods.**—*J. Lab. clin. Med.* **25.** 445-463. 4 figs., 3 tables. [Numerous refs.] [Authors' summary copied *verbatim*].

The interrelationships, properties and reactions of the clinically important blood pigments have been reviewed. The methods for the determination of sulfhemoglobin and methemoglobin have been presented and critically discussed. Simple and accurate spectrophotometric methods for the determination of sulfhemoglobin and oxyhemoglobin in mixtures have been described.

Millikan, G. A. (1939). **Muscle Hemoglobin.**—*Physiol. Rev.* **19.** 503-523. 2 figs., 3 tables. [Numerous refs.]

A review article chiefly covering work published since 1921. Muscle haemoglobin is found in highest concentration in muscles requiring vigorous repetitive activity which must be maintained, *e.g.* heart muscle of the larger mammals, breast muscle of the larger birds such as the pigeon, and leg muscle of running animals such as the dog and horse. The same muscles may vary widely in concentration from individual to individual and from time to time, depending on the age of the animal and the amount of use to which the muscles are put. A table from Whipple (1926) gives the muscle haemoglobin concentration in dogs at different ages and of different breeds. Muscle haemoglobin can now be obtained in crystalline form, and M. has compiled a useful table showing the comparative chemical and physical properties of muscle haemoglobin and blood haemoglobin. The role of muscle haemoglobin in body metabolism is reviewed with the following conclusions :– there is no evidence that muscle haemoglobin acts catalytically, though its properties are intermediate between those of the blood haemoglobins

and oxidation enzymes ; it does act as a short-time oxygen store, tiding the muscle over from one contraction to the next. The function of haemoglobin in the metabolism of the cell is discussed. Only a brief reference is made to the abnormal appearance of muscle haemoglobin in urine and to CARLSTRÖM's work on equine haemoglobinuria.—N. J. SCORGIE.

DUCKWORTH, J., & GODDEN, W. (1939). **The Partition of Serum Calcium in Domestic Animals—Some Pathological Cases.**—*Vet. J.* **95.** 386-392. 1 fig. [4 refs.]

Studies were made on the partition of serum Ca in various diseases of certain domesticated animals. Serum Ca was partitioned into :- (1) ultrafiltrable Ca, further subdivided into ionic Ca and an ultrafiltrable Ca complex, and (2) non-ultrafiltrable Ca, subdivided into non-ultrafiltrable Ca complex and protein-bound Ca. The animals studied were four cows, two calves, one horse and five sheep, all under different but specified conditions of ill-health. As there was little or no connexion between these conditions and between the results obtained, the reader is referred to the original for the actual detailed results, which serve mainly as records of the partition of serum Ca in various pathological conditions in domesticated animals.—ALFRED EDEN.

RAY, S. C. (1939). **Studies of the Physico-Chemical State of Calcium in the Serum of the Ruminant.**—*Biochem. J.* **33.** 1599-1605. 1 fig., 3 tables. [13 refs.]

The unreliability is pointed out of the pK values derived from the McLean-Hastings equation relating serum calcium and serum protein. In experiments with cows, pK values showed maximum displacement during periods of higher P intake. In fasting sheep and goats serum P and pK values were increased and serum Ca diminished.—H. H. GREEN.

BENETATO, G., & CIURDARIU, P. (1939). Influence de l'age sur le potassium sanguin. [**Influence of Age on Blood Potassium**].—*C. R. Soc. Biol. Paris.* **132.** 175-177.

The tabulated results indicate that the serum K level is higher in aged rats and men than in those of early adult age. The average for five two-year-old rats was 19% higher than the average for five rats eight to nine months old, and similarly that for men between the ages of 70 and 104 years was 34% higher than for men of 19-22 years.—R. ALLCROFT.

EDEN, A. (1939). **The Influence of Varying Copper Intake on Normal Blood Copper of Northumbrian Sheep.**—*J. comp. Path.* **52.** 249-257. 1 fig., 3 tables. [5 refs.]

The distribution of blood Cu was studied in 306 sheep divided into five experimental groups on a " border pining " hillside in Northumberland on which the natural grazing showed a Cu content of 7-10 p.p.m. on the dry matter. One hundred and fifteen of these animals, controls on grazing only, had a blood Cu range of 0·029-0·128 mg.% with a mean of 0·071 mg. A somewhat wider range, 0·016-0·164 mg.%, but with a slightly higher mean of 0·090 mg. was found in sheep receiving a small supplement of heavily mineralized cake containing sufficient Cu to double the daily Cu intake. The additional Cu, however, did not bring the lower values up to the mean values of the controls, from which it may be assumed that low values were not due to Cu deficiency and that the wide variations shown between individual sheep is a natural phenomenon.

Sheep which received monthly anthelmintic treatment with $CuSO_4$ in solution

either alone or in conjunction with supplementary mineralized cake showed a more uniform blood Cu level, but no pronounced elevation of mean value.

There are preliminary indications that one-year-old sheep have slightly higher blood Cu levels than older sheep, the difference being more pronounced in animals receiving Cu from birth.—R. ALLCROFT.

YOUMANS, G. P., LIEBLING, J., & LYMAN, R. Y. (1938). **The Bactericidal Action of Prostatic Fluid in Dogs.**—*J. infect. Dis.* **63.** 117-121. 4 tables. [4 refs.]

The germicidal action of prostatic fluid obtained aseptically from normal dogs was tested on *Bacterium coli*, *Staphylococcus aureus*, streptococci and gonococci. A marked germicidal power was demonstrated for *Bact. coli*, *Staph. aureus* and streptococci, and a very slight germicidal action for the Torrey strain of the gonococcus. There was a wide variation in the germicidal power of the various samples tested, and in one case the sample was entirely devoid of such action. Germicidal power appeared to be greater for *Bact. coli* than for *Staph. aureus*, while different strains of these organisms gave variable results with the same sample. The pH of the samples varied widely, but had no relation to the bactericidal action. In tests made to compare the germicidal power of the prostatic fluid with the germicidal power of serum taken from the same dog it was found that both *Bact. coli* and *Staph. aureus* grew luxuriantly in the blood serum of dogs whose prostatic fluid was markedly germicidal. The germicidal power was destroyed when the fluid was heated at 60°C. for 30 minutes. The fluid could be kept as long as three months in the ice-box without loss of germicidal power. It did not contain complement or lysozyme. The germicidal action could be removed by adsorption with *Bact. coli* or *Staph. aureus* and was non-specific towards bacteria.—F. T. B.

TRUHLAR, J., DREKTER, L., MCGUIRE, Grace, & FALK, K. G. (1939). **Studies on Enzyme Action. LI. The Phosphatase Actions of Tissues of Normal and Rachitic Rats.**—*J. biol. Chem.* **127.** 345-351. 3 tables. [6 refs.]

The phosphatase actions of lung, liver, kidney, heart and whole rat extracts were determined. No difference in actions was observed between preparations from normal and rachitic animals.—R. N. C. AITKEN.

WALTON, A., & EDWARDS, J. (1938). **Criteria of Fertility in the Bull. I. The Exhaustion Test.**—*Proc. 31st ann. Meet. Amer. Soc. anim. Prod., 1938.* pp. 254-259. 2 tables. [6 refs.]

A single test cannot be taken as a sufficient criterion of a bull's fertility, although it may distinguish between a fully fertile animal and one with a very low grade of sperm production. A more representative test is the " exhaustion test " devised by the authors. They describe the procedure, which consists of double collections of semen with an interval of 1½ minutes between each collection : these double collections are repeated with intervening rest periods of half an hour until five double collections have been made. In their experiments the authors have attempted to put the estimation of sperm activity on a quantitative basis by measuring the oxygen up-take of a sperm suspension by means of a Barcroft-Dixon manometer. They fully realize that this technique is open to criticism on various points, but think that it is probably justified when the object is to study differences between bulls, rather than to obtain absolute values. Data are given showing the relationship between the service records of 13 bulls in two herds where the fertility was low. The results showed that there was a definite correlation between service per conception and respiration rate of the sperm. There was no definite correlation

between fertility and the other criteria (volume, density, total number, etc.). The conclusion drawn from this investigation is that under unfavourable breeding conditions the bulls with the most active sperms as judged by respiration, have the greatest chance of producing offspring.—N. J. SCORGIE.

I. MILLER, W. C., & DAY, F. T. (1939). **The Diagnosis of Equine Pregnancy.** —*J. R. Army vet. Cps.* **10.** 95-105. 12 figs. on 3 plates, 1 table. [1 ref.]

II. CREW, F. A. E. (1939). **Biological Pregnancy Diagnosis Tests. A Comparison of the Rabbit, the Mouse, and the "Clawed Toad"** (*Xenopus laevis*) **as the Experimental Animal.**—*Brit. med. J.* April 15th. 766-770. 3 tables. [9 refs.]

I. The authors first refer to the difficulties involved in the diagnosis of equine pregnancy by clinical methods alone. These difficulties arise from two causes :– (1) the absence of objective clinical manifestations in a large proportion of mares, especially during the first third of gestation and (2) irregularities in the oestral cycle. During recent years, however, considerable progress has been made in clinical and biological methods of diagnosing pregnancy, and the authors describe a number of tests which are in current use at the present time :–

(1) *Mucin Test.*—First described by KUROSANA in 1931. The authors describe fully their methods of carrying out the test, and reproduce four excellent photographs showing the appearance of smears from pregnant and barren animals. This test may be used commencing from one month after the onset of pregnancy. The accuracy of the test increases as pregnancy advances, as will be seen from the following table given by the writers :–

Stage of Pregnancy. (Days.)	*No. of Mares Examined.*		*Percentage Accuracy of Test.*
	Correct Diagnosis.	*Incorrect Diagnosis.*	
20-40	47	8	85·5
40-50	28	7	80·0
50-60	28	5	84·8
60-70	23	5	82·1
70-80	24	2	92·3
80-90	22	3	88·0
90-100	23	1	95·8
100-120	45	4	91·8
over 120	60	2	96·8

The possible causes of incorrect diagnosis are referred to.

(2) *Rectal Palpation Test.*—The condition of the uterus and the size of the embryo at the various stages of gestation are described. Day has found it difficult to palpate the foetus *per rectum* before the 45th day.

(3) *Blood-Serum Test.*—This test is generally applicable only between the 45th and 90th day of gestation. The test is based on the concentration of gonadotrophic hormone in mare's serum, the test animals being infantile mice. A full description of the test is given. It is stated that reactions in the test mice are strong and definite ; there is very little likelihood of doubtful reactions being encountered.

(4) *Urine Test.*—[See *V. B.* **5.** 463 ; **6.** 179 and 274; **7.** 88]. A description of the method of carrying out the test is given. The high degree of accuracy claimed in earlier publications has not been substantiated. It would appear that in a number of mares oestrone production is irregular, thereby leading to an inaccurate diagnosis. The authors refer briefly to certain causes of irregular oestrone production.

II. Impressed by reports concerning the use of *Xenopus laevis* as an experimental animal in biological tests for the diagnosis of human pregnancy, C. carried out a number of parallel series of tests using *X. laevis* (designated " the Hogben test " by C.), the Friedman test and the Aschheim-Zondek test. He points out that the Friedman is a " rapid " test giving a result in 24-48 hours, whereas five days is required for the A.-Z. test. The advantage of the latter lies in the fact that it yields with different concentrations of hormones a graded series of reactions ; it is also possible to distinguish between true pregnancy and certain abnormal conditions.

A parallel test was carried out on 31 samples of urine by the Hogben and A.-Z. tests ; in 13 both mice and toads gave a positive result ; in a further 13 both gave negative results, while in the remaining five the results were in disagreement. This divergence in the results was possibly accounted for by the method of preparation of the urine specimen ; in this series of tests the Zondek method was used, in which alcohol is used for precipitation of the urine. Accordingly, in a second series of tests acetone was substituted for alcohol, but with 230 specimens of urine there was disagreement in 7 % of the tests, the Hogben test giving a false negative in ten and a false positive in six cases. These results clearly showed that this method of preparation and/or concentration is unsuitable. As a result of further experimentation, it was decided that 2 c.c. of a 20:1 concentration should be adopted as a routine procedure. In 93 parallel A.-Z., Friedman and Hogben tests using this method, there was only one disagreement. In a further series of 80 tests, 100 % agreement in the results was obtained. Disadvantages of the Hogben test are its expensive nature and the fact that no graded results are possible. C. concludes that the Hogben test can replace the Friedman but not the A.-Z. test.

—N. J. Scorgie.

Münich, J. (1937). Adatok az előrehaladottan vemhes kanca vizeletének hormontartalmához. [**Hormone Content of the Urine of Pregnant Mares**].—*Thesis, Budapest.* pp. 20. 4 figs., 2 tables. [15 refs.] [German summary].

M. examined the urine of 19 pregnant mares, of nine mares which had aborted 24-48 hours previously, and of two mares which shortly before had foaled normally. The urine was tested for oestrone by the Allen-Doisy method, for prehypophysin by the Aschheim-Zondek method and for progesterone by Hetzel's modification of Clauberg's method.

Oestrone was found to be present in all the samples. The prehypophysin tests were positive in 12 and negative in seven samples taken from the 19 pregnant mares, positive in one and negative in one of the two samples from mares which had foaled normally, and positive in three and negative in two samples from five mares which had aborted.

The progesterone test, with samples of urine of seven pregnant mares, was positive in five and negative in two cases ; with samples of the urine of nine mares which had recently aborted, the result was three positive and six negative ; the urine of two mares which had foaled normally was negative in both cases.

—G. Sályi (Budapest).

REYNOLDS, S. R. M., & FOSTER, R. I. (1939). **Physical Conditions in the Uterus Governing the Duration of Pregnancy.**—*Anat. Rec.* **75.** 175-193. 2 figs., 1 plate, 3 tables. [5 refs.] [Authors' summary copied *verbatim*].

1. Observations are recorded of the rate of growth of the uterus and the parts of the products of conception on the sixteenth day, the twenty-second, twenty-eighth and the thirty-first days of pregnancy in the rabbit.

2. Measurements of intrauterine pressure were made on these days, and from these data, along with data on the shape and dimensions of the gravid uterus in situ, the tensions on different aspects of the uterine wall were calculated.

3. The results show that intrauterine pressure reaches two maximal peaks, the first about the twenty-second day and the second, at term. The basis of the temporary decrease about the twenty-eighth day lies in the change of shape of the conceptus from a sphere to a cylinder, with a concomitant change in the pressure: tension relationships.

4. Associated with the attainment of the first peak of intrauterine pressure is a temporary fall in the flow of maternal blood through the placenta, while at the time of the transient decrease of pressure a secondary rise in the rate of blood flow takes place through the maternal vessels in the placenta. At the time of the final rapid increase of intrauterine pressure, a marked diminution takes place in the volume of maternal blood in the uterus (Barcroft and Rothschild). The intrauterine pressure is the local determiner of the efficiency of the flow of maternal blood through the uterus.

5. The final increase in intrauterine pressure results from complete cessation of uterine growth at the time of most rapid foetal growth.

6. The onset of labour in the rabbit coincides with a degree of uterine distention which imposes upon the mesial wall, i.e. placental vascular bed of the uterus, tension about equal to the maximal tension occurring elsewhere on the uterine wall. Until this time, anatomical and physiological conditions are such that the tension of the mesial wall remains relatively low. Pregnancy comes to an end in the rabbit when the pressure on the placental vascular bed becomes sufficiently high that it affects adversely the efficiency of the flow of maternal blood through this organ, so reducing the nutritional supply at a time when the foetus is growing most rapidly.

EDWARDS, J. (1940). **The Effect of Unilateral Castration on Spermatogenesis.** —*Proc. roy. Soc.* Ser. B. **128.** 407-421. 2 figs., 6 tables. [15 refs.] [Author's summary copied *verbatim*].

The effect of unilateral castration in the sexually mature rabbit on the production of spermatozoa has been studied quantitatively by means of semen exhaustion tests.

The frequency of collection is shown to have kept pace with the rate of production of spermatozoa by the testis.

Contrary to what occurs in the ovary there is no hypertrophy of spermatogenic function or of weight of testis following unilateral castration.

There is a highly significant positive relationship between the weight of the testicular substance and the numbers of spermatozoa which it produces.

The passage of spermatozoa through the epididymis may be accomplished in four to seven days.

TECHNIQUE AND APPARATUS

RYU, E. (1939). **On a Simplified Method of Staining Acid-Fast Bacteria.**—*Jap. J. vet. Sci.* **1.** 539-543. 2 figs. on 1 plate. [8 refs.] [In Japanese: abst. from English summary].

The material to be examined is mixed with a loopful of 3% caustic potash, spread in a thin film and fixed by heat. The film is covered with 0·05% fuchsin (not carbol fuschin), passed several times through the bunsen flame and allowed to stand for 20-40 seconds and, without decoloration, is counter-stained by a 2% solution of methylene blue for half a minute.—F. T. Boyle.

Novel, E. (1939). Une technique facile et rapide de mise en évidence des cils bactériens. [**An Easy and Rapid Technique for Demonstrating Bacterial Flagella**].—*Ann. Inst. Pasteur.* **63.** 302-311. 6 figs. [Numerous refs.]

An emulsion of one loopful of young culture in 3 c.c. of distilled water is prepared and 3-5 separate drops are placed on the slide which is maintained at 50°C. on a hot plate; no fixation is required. A mixture of 50 c.c. 20% aqueous tannin solution, 40 c.c. saturated solution of ferrous sulphate and 7 c.c. saturated alcoholic solution of fuchsin is applied for one minute. The preparation is washed with distilled water and then impregnated with ammoniacal silver nitrate solution for 15-24 seconds. After further washing the preparation is complete.—E. C. H.

I. Delaplane, J. P., & Stuart, H. O. (1938). **A Growing Yeast Medium for the Cultivation of Hemophilic Bacilli and of an Organism Causing a Bronchitis in Chickens.**—*Science.* **87.** 585-586. [2 refs.]

II. Delaplane, J. P., & Stuart, H. O. (1939). **A Growing Yeast Medium for the Cultivation of Haemophilic Bacilli.**—*J. Amer. vet. med. Ass.* **95.** 326-328. [4 refs.]

I. A medium is described for the growth of *H. influenzae* and *H. gallinarum* which enabled these workers to maintain cultures of these organisms by weekly transfers, and gave a better growth than a medium containing blood. All the growth requirements of the haemophilic bacteria are supplied by the medium; the growing yeast causes a change in the pH from the acid to the alkaline side which the authors suggest may account for the successful growth obtained.

This medium was used for the investigation of an infectious bronchitis of birds in which the use of blood-enriched media had failed to reveal any bacteria which could have been regarded as of aetiological significance. By the use of the yeast medium described, an organism, whose morphology is briefly described, was isolated from the respiratory tract from typical cases of the disease, and reproduced the disease when transmitted to healthy birds.

II. Growing yeast supplies those factors also present in blood necessary for the growth of haemophilic bacteria. The authors briefly indicate the steps they followed in arriving at the final medium used which has the following composition :– Difco nutrient agar 23 g., Difco phenol-red maltose or dextrose 10 g. and salt 8 g., added to 1,000 c.c. of broth or water in which 400 g. of potato had been cooked.

The medium can be sterilized by heat; the slants are inoculated from primary cultures of yeast and the haemophilic organism. When beef extract is present the growth of the yeast renders the medium slightly alkaline; but if the beef extract is replaced by peptone the medium remains acid and the growth obtained is poor. *H. gallinarum* retains its virulence for chickens when grown on this medium. A vaccine of *H. gallinarum* prepared from growths on the medium was of no value in the stimulation of immunity against infectious coryza.

Preliminary studies suggest that the medium may be used for the growth of antigen as the yeast and bacteria may be separated by centrifugation.—L. E. H.

KLOTZ, L. J. (1940). **Uniformity in the Differential Enumeration of Leucocytes.** —*J. Lab. clin. Med.* **25.** 424-434. 16 tables. [Numerous refs.] [Author's summary copied *verbatim*].

A statistical evaluation of certain techniques of differential leucocyte enumeration has been made. Random counting on uniform smears is shown to be at least as accurate as four-field counts of 200 and 300 cells, and more accurate than 100 cell counts by the latter method.

It is shown that reasonable accuracy can be obtained by random counting of 300 cells in most instances and that the counting chamber technique of differential enumeration as described is valueless.

GLAUBIGER, A., & FALK, K. G. (1940). **The Determination of pH Values of Biologic Fluids. I.**—*J. Lab. clin. Med.* **25.** 369-376. 3 tables. [7 refs.] [Authors' summary copied *verbatim*].

An experimental study of the pH values of buffer solutions, bacteriologic media, and biologicals is presented, using the glass electrode and some of the colorimetric procedures which have been developed. The differences in the pH values obtained under different conditions of testing and the possible influence of these differences in routine work are indicated.

HARRIS, A. H. (1939). **A Collodion Sac for Use in Animal Experimentation.**—*J. Bact.* **38.** 321-332. 2 text figs., 8 figs. on 2 plates. [17 refs.]

A detailed description of the preparation of a sac for intraperitoneal implantation is given. The sac consists of a semi-permeable membrane of acetic-acid collodion supported by a cylinder of stainless steel wire gauze. The cylinder is closed at one end by a plug of carnauba wax ; the other end is also closed by wax, through which a glass tube is passed. The ends of the cylinder are reinforced with heavy alcohol-ether collodion. The sac is sterilized by immersion for 18 hours in 1:100 sodium hypochlorite solution followed by prolonged washing in distilled water. The test fluid is introduced into the sac through the glass tube which is subsequently plugged with sterile, hard paraffin. A coating of alcohol-ether collodion completes the sealing of the sac.—E. C. HULSE.

LIBET, B., & YESINICK, L. (1939). **Note on a New Method for the Collection of Urine in Dogs.**—*J. Lab. clin. Med.* **24.** 1304-1306. 1 fig. [1 ref.]

Suprapubic cystotomy is performed and a hollow spherical glass bulb 2-5 cm. in diameter is inserted. A glass tube of 2 mm. bore, about 25 cm. in length, forms the outlet of the bulb. The bulb is perforated with twelve or more holes of 4 mm. bore and the tube bent 30° from the horizontal at about 10 cm. from the bulb. The urethra is securely tied off so that no urine can escape from the bladder except *via* the tube, and the blood supply to the bladder is cut off to prevent any blood appearing in the urine. The incision in the bladder is closed tightly around the emerging tube by sewing together the cut edges, and the collection of urine may be facilitated by turning the animal on its side.—R. ALLCROFT.

KRAUSE, F. (1937). Das magnetische Elektronenmikroskop und seine Anwendung in der Biologie. [**Magnetic Electron Microscope and Its Use in Biology**]. —*Naturwissenschaften.* **25.** 817-825. 8 figs. [14 refs.] [Abst. in *Arch. Path.* **18.** 417, copied *verbatim*].

Krause has traced the development and discussed the theoretic basis and resolving power of the Knoll-Ruska type of electron microscope. The limits of resolution are indicated. The article is illustrated with electronic photographs of

cells and bacteria. The optical image sometimes differs from the electronic image, owing to differences in diffractive qualities of the two types of rays. Several methods of using the electron microscope in biology are considered and suggested.

MORTON, H. E. (1939). **The Construction of an Inexpensive Power Washer and the Designing of Economical and Efficient Brushes for the Cleaning of Laboratory Glassware.**—*J. Lab. clin. Med.* **25.** 211-215. 3 figs. [Author's summary copied *verbatim*].

An inexpensive power washer is described which is far superior to the hand process for cleaning glassware.

Brushes for cleaning the usual laboratory glassware are described which are more economical and efficient than any heretofore obtained.

These innovations bring about great savings in time and materials.

ZSCHOKKE, M. (1939). **Tattooing as a Means of Marking Stock.**—*J. S. Afr. vet. med. Ass.* **10.** 69-71. 3 figs.

The identification of Karakul sheep presents serious difficulties by ear tag methods and even tattooing in the ears. Z. has had great success in tattooing the sheep on the thin skin on the underside of the tail. The forceps is placed over a fold of the skin and two marks, one inverted, are produced. Care should be taken when applying the ink to cover up the inverted mark so that only one mark shows up.—E. M. ROBINSON.

TILLEY, F. W. (1939). **An Experimental Study of the Relation between Concentration of Disinfectants and Time Required for Disinfection.**—*J. Bact.* **38.** 499-510. 5 figs., 4 tables. [3 refs.]

The bactericidal efficiency of phenol, orthocresol, paracresol, orthobutylphenol, parabutylphenol, resorcinol, n-propylresorcinol, ethyl alcohol and n-butyl alcohol against *Staphylococcus aureus* and *Eberthella typhosa* was determined by a modified Rideal-Walker technique. The basic equation for disinfection is $C^n . t = A$ (or, in its logarithmic form, $n \log C + \log t = \log A$), where A is a constant, t = time, C = concentration, and n = the concentration exponent, whence n can be calculated by observations of the difference in concentrations at known times from the expression, derived from the above: $n = \frac{\log t_2 - \log t_1}{\log C_1 - \log C_2}$ and log A is derived from the basic equation. Results of experiments conducted at different temperatures suggest that values of the concentration exponent n are essentially characteristic for each disinfectant with each test organism.—J. M. ROBSON.

MISCELLANEOUS

BISSCHOP, J. H. R. (1938). **The Relation between Environment and Animal Breeding with Special Reference to the Breeding of Cattle in the Semi-Arid Regions of South Africa.**—*Rep. 13th int. vet. Congr. 1938.* **2.** 935-980. 6 tables, 3 graphs. [10 refs.] [In English: French, German and Italian summaries. Discussion pp. 1011-1015 in English, French, German and Italian].

B. states that the breeding policy adopted in tropical and sub-tropical regions which has been formulated on Mendel's genetic principles has failed owing to lack of recognition of the effects of environment (climate, disease, parasites and

deficiencies in the available food). As the effects of environment remain constant, adaptation and phenotypic changes have taken place in breeds which survive. The low nutritional factor is the most important. High altitude, seasonal and diurnal temperature changes, low relative humidity and high intensity of the infra red and ultra-violet rays also influence animal functions. The animal disease factor has now to a great extent been controlled. In experiments described by B. indigenous breeds reacted more favourably than exogenous breeds to a corrected phosphorus deficiency in the available grazing. Exogenous breeds being genetically unsuited to a phosphorus-deficient environment react through the physiological specializations responsible for the creation of functional types. Reduction in body size is the most obvious change even in the pure exogenous cattle. B. considers that the excellence of half breds as compared with their indigenous dams is due to the superior genotypic potentialities inherited from their exogenous sires. This superior genotype is capable of considerable phenotypic manifestation, as adverse influences of environment are counteracted by protective forces which the half breds possess in their native blood characteristics. Hybrid vigour may play a protective role although external conformation of half breds shows no signs of it. Inferiority of ¾ and higher exogenous grades may be explained by the reduced amount of indigenous blood characteristics.

In the discussion Olver mentioned the poor results obtained with imported bulls in India; he considered that disease, feeding and watering conditions in India could not explain the definite degeneration of exogenous cattle and their cross bred progeny. Henry referred to the difficulty of drawing conclusions on climatic effects without controlled and balanced feeding. Du Toit said Friesians and other imported breeds can be bred satisfactorily in South Africa if they are fed and housed properly. He said it is a mistake to think imported breeds are necessarily more susceptible to disease. Carefully controlled experiments have not always supported this view.—J. A. Griffiths.

Eyraud. (1939). L'effort des vétérinaires français au Maroc. [**The Work of French Veterinarians in Morocco**].—*Cah. Méd. vét.* **9.** 181-186. 4 figs.

This is a short history by the new director of the French veterinary and livestock service of Morocco. The service, which was created in 1913, comprises 28 French veterinary inspectors, of whom four work at the central research laboratory [at Rabat], 10 French livestock inspectors, 37 native veterinary assistants and 10 native stock inspectors. There are 12 municipal veterinarians. In addition nine French army veterinary officers and three French private practitioners work in Morocco.

In animal disease control work, chief attention is given to vaccination against anthrax, blackleg and sheep pox, rabies control, preventive measures against bovine piroplasmosis, prevention of dourine by naganol and its treatment by novarsenobenzol and control of ecto- and endo-parasites. 57 dipping baths are in use.

The research laboratory was under the direction of M. Velu from 1913-1938, when he was succeeded by M. Zottner. A list of methods of prevention and treatment developed in the laboratory is given.

Particulars are given of the livestock industry. There are three government farms and five " livestock stations ". Development has been so successful that Morocco is now a livestock exporting country (figures for 1937 are given).—J. E.

Stevenson-Hamilton, J. (1939). **The Health of Wild Animals.**—*J. S. Afr. vet. med. Ass.* **10.** 56-64.

The author is the warden of the famous Kruger National Park in South

Africa and records some of his observations made over a period of 36 years in this Game Reserve. Some interesting notes are given on the fluctuation in numbers of different animal species. The wild dog (*Lycaon pretus*) which used to exist in packs of 50 or more has almost disappeared for some unknown reason. Another species, the reedbuck, which once existed in great numbers, has almost disappeared as well, except in the northern part. It is possible that the mortality in the wild dogs was due to *Rickettsia canis* infection as this disease is very fatal to domesticated dogs in the area. Enormous invasions of small rodents have occurred from time to time but their numbers have subsequently become normal again. The author speculates on the reason for the disappearance of the tsetse fly during the rinderpest outbreak of 1896 in the Game Reserve area, but is unable to throw any new light on it.—E. M. ROBINSON.

BABLET, J. (1939). Du rôle et des limites des recherches histopathologiques en médecine et en biologie. **[The Role and Limits of Histopathology in Medicine and Biology]**.—*Biol. méd.* **29.** 319-335. [6 refs.]

An account is given of the history of morbid anatomy and pathological histology with especial reference to their importance in human medicine. Particular stress is laid on the contributions of France, and there is a description of the work carried out by the branches of the Pasteur Institute in tropical countries.—E. G. WHITE.

OFFICIAL AND OTHER REPORTS

BRITISH SOMALILAND. (1939). **The Annual Report of the British Somaliland Veterinary and Agriculture Department for 1938.** [PECK, E. F.] pp. 23+3. [fcp] [Mimeographed].

From 14th January until 12th June the Department was without European supervision. A severe drought during the year caused many abortions and the death of young stock.

Somaliland Camel Corps.—The raising of the salt ration of camels to 4 oz. daily is said to have eliminated ARTHRITIS, formerly a cause of considerable wastage, and a full salt ration is recommended for all camels receiving grain.

Periodic application of the mercuric chloride test for SURRA yielded 12 reactors, which were treated with naganol.

Trichostrongylosis in camels was treated with copper sulphate and nicotine sulphate. Good results were obtained by the use of horse-sickness vaccine for ponies and mules of the Camel Corps. The animals of the Corps were immunized as usual against anthrax, and there were no cases of the disease. The incidence of HELMINTHIASIS of ponies has been reduced by the use of oil of chenopodium and turpentine.

Protectorate Animals.—The incidence of and mortality from RINDERPEST were normal for the Protectorate, and those of CONTAGIOUS BOVINE PLEURO-PNEUMONIA somewhat less than usual. Several severe outbreaks of HORSE SICKNESS were recorded among native-owned ponies.

There was a high mortality in unweaned camel calves from DIARRHOEA. *Babesia motasi* was recorded for the first time from the Protectorate.

The incidence of SURRA in camels has been greatly reduced, in the Protectorate ; but over 6,000 camels were treated with naganol, most of them coming from the Ogaden and some from as far as Jubaland,

Somalis now appreciate the usefulness of dipping, and some 48,000 sheep and 14,000 goats were dipped as compared with 14,500 and 3,000 respectively during the previous year.—F. J. ANDREWS.

NYASALAND PROTECTORATE. (1939). **Report of the Veterinary Department for the Year ended 31st December, 1938.** [DE MEZA, J.] pp. 26. 2 tables. Zomba: Govt. Printer. [fcp] [1s.]

The position with regard to animal health was satisfactory. There were no serious outbreaks of disease. Cases of tick-borne disease were recorded all over the country with several deaths in the enzootic EAST COAST FEVER areas. Calf diseases such as HELMINTHIASIS, E.C.F. and other tick borne diseases are more often a cause of death when there is a primary condition of malnutrition. Native cattle owners are therefore given practical demonstrations of proper methods of feeding and general animal hygiene at the Native Authority Stock Farms in Bzimba, the centre of the E.C.F. enzootic area.

RABIES was prevalent among dogs, but with co-operation from both Africans and Europeans in applying newly enacted legislation, the position is now more reassuring.

The incidence of RINDERPEST in Tanganyika Territory and its steady advance southward, caused grave anxiety early in the year. The measures taken, however, as a result of the recommendations of a conference at Nairobi held in January 1938, when delegates from all the interested African territories attended, appear to have been of value. In one outbreak of TRYPANOSOMIASIS in a herd of cattle "Antimosan", given subcutaneously, was used with very satisfactory results.

It is stated that three cattle still survive at the Domira Bay station where they have lived for three years in a tsetse fly area. They have only received one dose of "Antimosan" each year. Trypanosomes have been demonstrated in the blood from time to time but the animals maintain a fair condition and are worked. This appears to be an acquired resistance. Trypanblue and acaprin were used with apparent success in REDWATER. ANAPLASMOSIS and *Theileria mutans* infections usually occur together with REDWATER. EQUINE PIROPLASMOSIS was diagnosed in one case which proved fatal, and "blood smears showed a heavy infection of *Babesia equi* and a few *B. caballi*."

No cases of HEARTWATER, ANTHRAX, BLACKQUARTER, CONTAGIOUS ABORTION or SWINE FEVER were reported. Several cases of fatal HORSE SICKNESS occurred in spite of the animals having been immunized. CALF PARATYPHOID (*Salmonella enteritidis* infection) appears to be common during the rains amongst high grade calves kept under bad hygienic conditions. Alopecia in calves appears to be on the increase; it occurs throughout the Protectorate. EPHEMERAL FEVER (THREE-DAY-SICKNESS) is most common in May and June (the cold weather). Canine DISTEMPER is said to be on the increase. Canine PIROPLASMOSIS is now treated with acaprin given subcutaneously.

Other diseases which are mentioned are SPECIFIC OPHTHALMIA for which early treatment gives satisfactory results, DEMODECTIC MANGE of cattle, STREPTOTHRICOSIS, ECZEMA, RINGWORM, ACTINOBACILLOSIS, CYSTICERCOSIS and MALIGNANT OEDEMA.

No specific research work was carried out. A good deal of the report deals with animal husbandry, veterinary education and the work at the demonstration stock farms. The marketing of slaughter animals and animal products is also fostered by the Veterinary Department.—J. A. GRIFFITHS.

HOLLAND. (1938). Verslag van de werkzaamheden der Rijksseruminrichting over 1937. [**Report of the State Serum Institute for 1937**]. [LOURENS, L. F. D. E.] pp. 100. 3 figs. on 2 plates, numerous tables. 'S-Gravenhage: Algemeene Landsdrukkerij. [8vo] [Fl. 1].

During 1937 antisera and vaccines were issued for use on 2,391,000 animals and 63,249 diagnostic examinations were made. Full statistical details are given.

For the control of BOVINE BRUCELLOSIS, the vaccination of young stock with live culture of low virulence is advocated in addition to the usual hygienic control measures. The institute regards agglutination titres of 1:20 or more as positive, and 1:10 as doubtful.

Glycocol and wheat-germ oil were used to prevent ABORTION in ewes: the former appeared to be of some value.

The intradermal test of DONATIEN and LESTOQUARD for SWINE FEVER was tested, but was judged to be of limited value.

The report of the AMBULATORY SECTION contains accounts of some obscure disease conditions and records cases of chronic anthrax in cows with recovery after treatment with antiserum. An account is also given of acute serofibrinous pleuritis, pericarditis, peritonitis and arthritis (occurring collectively in pigs); the cause of this condition was not determined. There were deaths in pigs from collections of sand in the colon.

C. J. DE GIER contributes an account of research on TRICHONEMA INFESTATION in horses. In horses dying as a result of infestation he was able to demonstrate the presence of larvae in the subcutis of the pasterns of the hind legs, oedema and inflammation in this area being a feature of the cases. H. suggests that percutaneous larval infestation occurs in nature and that the larvae migrate by the arterial blood system to the aorta and thence to the wall of the large intestine, where they were also found in great numbers in the cases examined.

Much research was done on JOHNE'S DISEASE: regular faecal examinations for the causal organism (in stained smears) were made on six naturally affected cattle, in two of them for 20 months. It was found there was considerable variation in the extent to which the organism was excreted; numerous intradermal tests on known infected and other cattle were made with johnin prepared from a three-month culture on Sauton's medium containing 1-5% extract of the Timothy grass bacillus. Reactions obtained were on the whole weak and rarely exceeded a threefold increase in skin measurement. The test is considered of some value in herd tests, but it is possible that the presence of tuberculosis or previous vaccination with BCG may influence the results. Two bovines fed as calves with large amounts of infected intestinal material, were in good condition after two years and were hardly, if at all, positive to the johnin test. Six animals which were vaccinated by Rinjard's method in 1936 (live culture suspended in olive oil with liquid paraffin and pumice stone) were tested two or three times with johnin during the ensuing 20 months; positive reactions were obtained throughout and the animals remained in good health.—J. E.

HOLLAND. (1938). Verslag over de werkzaamheden van het staatsveeartsenijkundig onderzoekingsinstituut over 1936 en 1937. [**Report of the State Veterinary Research Institute, Rotterdam, for 1936 and 1937**]. [FRENKEL, H. S.] pp. 87. 4 plates, 4 tables, 1 chart. [Numerous refs.] [In Dutch, English and French].

As is customary, this report contains a short introduction, which includes a list of the staff of six, and signed articles of the research work carried out. All the articles have been treated separately for the purposes of *Index Veterinarius*

and the *Veterinary Bulletin*. The work described was confined to foot and mouth disease, except for one paper on pox virus. The institute prepared immune serum for use in the recent European outbreak and determined the type of virus present in Holland as the " O " type.—J. E.

HOLLAND. (1939). Mededeelingen betreffende den gezondheidsdienst voor vee in Friesland. Twintigste jaarverslag 1 Mei 1938-30 April 1939. [**Twentieth Report of the Animal Health Service for Friesland, 1938-39**]. [VEENBAAS, A. H.] pp. 51. 1 table. [8vo].

This 20th annual report records a progressive advance in the livestock health service. The work done is reported statistically and by narrative.

In the control of BOVINE TUBERCULOSIS, close on 230,000 animals in 10,900 herds (60% of the total number of cattle) were examined and tuberculin tested. The percentage of reactors was 8·3, representing a fall of 5% since 1933. 7,179 herds were free from TB. The test used was the double ophthalmic (instillation). During the year an improvement was made in the disposal of cattle with open TB. Nearly all such animals were taken by the state veterinary service and destroyed at a single abattoir and animal products plant. Regulations of the Friesian control scheme are given as an appendix.

JOHNE'S DISEASE was diagnosed in 352 animals from 1,772 faecal samples sent for examination.

Ten thousand cattle on 324 farms were blood tested for BRUCELLOSIS, 15% reacting at a titre of 1:50 or higher. Several hundred cattle which had been vaccinated with culture of low virulence as maiden heifers were tested and 5% reacted ; 1% of these aborted. In a control group of equal size 9% reacted and 4% aborted.

MASTITIS was very prevalent and often a sequel to FOOT AND MOUTH DISEASE, the *Corynebacterium pyogenes* type being common. Preliminary trials with white prontosil, di-sulphanilamide and trypaflavine in streptococcal mastitis did not give markedly better results than entozon, which has been used for years past.

Short notes are also given on other diseases, milk and water analyses, etc.—J. E.

DUTCH EAST INDIES. (1939). Jaarverslag van den veeartsenijkundigen Instituut Buitenzorg, Java over 1938. [**Report of the Veterinary Institute, Buitenzorg, Java, for 1938**]. [HUBER, F. L.] pp. 67-109. 10 tables, 1 chart. Batavia : Landsdrukkerij. [4to].

The staff remained as in the year before and included four Europeans.

The work of the DIAGNOSTIC SECTION is given in tabular form.

The SEROLOGICAL SECTION carried out tests for ANTHRAX, TUBERCULOSIS, GLANDERS and BRUCELLOSIS. Comparative tuberculin tests with the ophthalmic and double intradermal methods on 197 cattle which were afterwards killed and autopsied, showed that the latter test (with synthetic medium tuberculin) was much the more reliable. The type of infection in 31 tuberculous animals was ascertained to be the bovine type in 24 cattle and the human type in one cow, three pigs, one monkey and one dog. *Pfeifferella whitmori* was isolated from the lung of a horse killed because glanders was suspected. Notes are given on the incidence of bovine brucellosis in parts of the D.E.I.

The SERUM-VACCINE SECTION issued large amounts of immunizing agents for use against ANTHRAX, HAEMORRHAGIC SEPTICAEMIA and BLACKLEG, particulars of their use in various areas being given. No cases of shock in buffaloes vaccinated against H.S. occurred in 1938. [For comparison with results in 1937, see *V. B.* **10.** 68]. Research into the cause of shock indicated that it is brought about by

constriction of the coronary arteries : it can be cured by the injection of adrenalin. There were losses in horses vaccinated against anthrax which could not be accounted for, though it has proved that the vaccine was innocuous.—J. E.

Extracts from Annual Reports of Agricultural Experimental Stations U.S.A.

[The matter given here is a bare outline of the work done. When papers by the staffs of these stations are published abstracts are prepared from them and included in the *Veterinary Bulletin* as a matter of routine. Details of the titles of these reports and of relevant papers contained in them will be found in the *Index Veterinarius*].

HAWAII, 1938.—Results of experiments on the following are given :– longevity of LIVER FLUKE cysts, development of liver fluke in the final host, life-cycle of the intermediate snail host of *Fasciola*, longevity of liver fluke in cattle, treatment of fluke-infected cattle with distol, kamala and with male fern, relation of nutrition to ascarid infection in fowls, and the life-history of the tapeworm *Hymenolepis exigua*. Two land snails, *Eulota similaris* and *Subulina octona*, serve as carriers of the caecal fluke (*Postharmostomum gallinum*) of poultry under natural conditions in Hawaii. The influence of splenectomy on recovery from nutritional anaemia in rats is described.

IDAHO, 1937-1938.—Records of the station indicate that definite results can be obtained by a selective breeding programme in reducing the general mortality in poultry, resulting from a complexity of diseases. Objections to the rapid whole-blood method for detecting PULLORUM DISEASE are discussed. " Krueger's undenatured vaccine " for the control of MASTITIS was tested, but no beneficial effect was obtained. Mineral metabolism in relation to the control of mastitis is being studied. The laboratory services have been extended.

INDIANA, 1937-1938.—Results of the injection of chicks with blood from hens and pullets showing symptoms of PARALYSIS and LEUKEMIA are given. Deaths in new-born pigs from dams on various diets are discussed. Further results are given on the group of heifers in the fourth calfhood vaccination experiment. *Vibrio foetus* was found in aborted material from a heifer in a herd free from BRUCELLOSIS, in which 11 of the animals had aborted. Two bulls whose semen contained *Brucella abortus*, due to natural infection, had agglutination titres of 1:2,500 and 1:100, but neither of the animals showed orchitis or other clinical symptoms. Results are recorded of 2,512 autopsies, and tissue and fluid examinations made at the station.

KANSAS, 1936-1938.—A list is given of diseases in which research was carried out, and notes are given on some of them, including the following :– ENCEPHALOMYELITIS, STRONGYLOSIS, and the pH of the alimentary tract of horses ; BRUCELLOSIS, ANAPLASMOSIS and KERATITIS in cattle ; and TUBERCULOSIS, PROTOZOAN PARASITES, HELMINTH PARASITES, FOWL PARALYSIS, SELENIUM POISONING and the anatomy of the respiratory tract of poultry.

MARYLAND, 1937-1938.—Experiments in progress in connexion with the experimental station dairy herd are briefly described. Two lots of commercial dog biscuits caused CANINE HYSTERIA under field conditions. The diagnosis, treatment and control of bovine PYELONEPHRITIS is briefly reviewed. EQUINE ENCEPHALOMYELITIS in Maryland is due to the eastern type of virus and attempts at treatment have been unsatisfactory. Prophylaxis with serum has been highly effective, but results with a vaccine have been inconclusive. Bacterin made from cultures of *Flavobacterium ophthalmiae* and also foreign proteins, *e.g.* sterile milk, gave good results in the treatment of PERIODIC OPHTHALMIA of horses and mules. The biological PREGNANCY TEST for mares using immature female rats proved

96 % efficient in tests of 280 mares. The etiology and pathology of STREPTOCOCCAL SEPTICAEMIA of horses and mules are being studied. Diagnosis of bovine TRICHOMONIASIS and MASTITIS and porcine TRICHINOSIS is briefly dealt with.

NEBRASKA, 1938.—The survival periods of *Erysipelothrix rhusiopathiae* (bacillus of swine erysipelas) in phenolized hog cholera virus averaged 29 days in six tests, whilst *Salmonella cholerae-suis* lived for an average of 17 days. Although swine may be immunized by hog cholera virus treated with crystal violet the method lacks constancy and the necessary degree of stability. The feasibility of simultaneous serum-culture inoculations in the prevention of swine erysipelas is discussed.

NEVADA, 1936-1937.—During the year unexplained deaths of sheep on certain Nevada ranges were investigated and the deaths appeared to be due to poisoning by *Astragalus speirocarpus* with which animal experiments have been carried out. Attempts to produce "SWELL HEAD" in sheep by *Tetradymia glabrata* failed. Serum was prepared against bacillary HAEMOGLOBINURIA due to *Clostridium haemolyticum* and arrangements are being made to prepare bacterins for its prevention. Further work was carried out on the causation of LYMPHANGITIS in cattle. Over 5,000 horses were immunized in various ways against EQUINE ENCEPHALOMYELITIS. Information obtained by the station confirmed the opinion that methods of herding profoundly affect the prevalence of *Oestrus ovis* in Nevada range flocks.

PENNSYLVANIA, 1937-1938.—Biological assay of tissues from growing calves with known vitamin D intake showed that efficiency of storage of this vitamin is very low in this animal. Rats partially deficient in vitamin B have a lower heat production than rats receiving adequate quantities of this vitamin. The minimum level for the growth, well-being and calcification of bone in dairy calves is 300 U.S.P. units of vitamin D per day. The optimum vitamin A requirement for chicks appears to be more than 200 and less than 300 units per 100 g. of feed. Phosphorus deficiency in cattle is primarily a result of improper farm practices and not of low phosphorus content in the soil. Studies were made on the feeding of rats on a copper- and iron-deficient diet. Methods for the determination of allantoin in bovine blood and urine have been developed; bovine blood contains 10-15 mg. per 100 c.c. Environmental temperature is not an important factor in the production or cure of RICKETS in rats. Evidence indicates that FOWL PARALYSIS can be partially eliminated by the use of families which show resistance to the disease and by breeding from hens in preference to breeding from pullets.

WASHINGTON, 1937-1938.—Feeding experiments to prevent feather picking and other forms of cannibalism in fowls are described. Oat hulls contain the anti-cannibalism factor, and the fibre appears to be the necessary element. Experiments to determine the effect on hatchability, chick mortality, growth and disease, of certain supplements in the diet are described, and further results are given on breeding experiments in connexion with disease resistance. Pullorum disease, fowl-pox vaccination, and shipping factors affecting egg quality are discussed. COCCIDIOSIS mortality was reduced by cleaning the fowl pens three times a week, but not by a twice weekly cleaning. The fungus type of GIZZARD EROSION in chickens is not common in western Washington. Wheat-germ oil did not have any beneficial effect on FOWL PARALYSIS. Results are given of an experiment to determine the value of a mash containing 30 % dry skim milk powder used as a flush for the control of caecal coccidiosis in chickens.

WEST VIRGINIA, 1936-1938.—Examinations were made on 11,846 animals or on specimens of material from such animals by the station laboratory. Standard middlings and wheat bran, owing to their manganese content, prevented PEROSIS in fowls.

WISCONSIN, 1938-1939.—Manganese sulphate in the ration of battery-raised

chicks proved of value in preventing slipped tendon or PEROSIS; the condition was further minimized by a ration, which, in addition to the manganese, contained not more than 0·75% phosphorus.—F. T. BOYLE.

BOOK REVIEWS

BELDING, D. L. [M.D. Professor of Bacteriology and Experimental Pathology, Boston University School of Medicine], & MARSTON, Alice T. [Ph.D. Assistant Professor of Bacteriology and Immunology, Boston University School of Medicine]. (1938). **A Textbook of Medical Bacteriology.** pp. xxxviii+592. 43 text figs., 6 figs. on 1 plate, 42 tables, 1 chart. [Numerous refs.] London & New York: D. Appleton-Century Co. Inc. [1st Edit.] [4to] [21s.]

In this book an attempt is made to cover the whole field of medical bacteriology, including the application of bacteriological technique to the realms of public health and preventive medicine. The result is a stimulating and well-balanced treatise which should prove of particular value to the more advanced student. In many respects it bears some resemblance to the "Recent Advances" series of books published in Great Britain, since particular attention is paid to the most modern theories of bacteriological evolution and immunity. It may be suggested, however, that as a result of this method of approach the fundamental principles underlying general and applied bacteriology are not discussed in sufficient detail for the average medical student, who will probably find himself out of his depth.

The book is divided into nine sections and seventy-two chapters. Twenty chapters are devoted to general and medical bacteriology: they deal with morphology, cultivation and biological activity of bacteria, and the general principles underlying disease. The four succeeding sections are concerned with individual organisms, including fungi and the spirochetes. The virus diseases are considered in a separate section. The volume concludes with 200 pages devoted to sanitary and economic bacteriology.

Since the book is primarily intended for medical students, it is not unnatural that the diseases of animals are discussed in a somewhat cursory manner. Its value to the veterinary student, except as a supplementary treatise to existing textbooks which have established their worth, is, therefore, strictly limited.

Whilst in general a high level of accuracy is maintained, the book is occasionally marred by over-statement of a particular aspect of a controversial problem; for example, the discussion on the dissociation of the tubercle bacillus is confined to eight lines (p. 304), of which three are devoted to Petroff's claim to having developed virulent forms of the tubercle bacillus from BCG.

The short section on animal diseases could be improved with slight revision; for example, it would be wiser in future editions to omit the term "symptomatic anthrax" (p. 244) in connection with *Cl. chauvaei* infections and to indicate that this disease is not wholly confined to cattle. The various types of *Cl. welchii* might also be mentioned with advantage. The table on p. 527 is incorrectly numbered.

The book is handy in size and is not overloaded with illustrations.—R. E. G.

BORY, L. [Chef de Clinique de la Faculté de Médecine de Paris, à l'Hôpital Saint-Louis]. (1939). Clinique et pathologie comparée. Vénéréologie, cancérologie, dermatoses, médecine générale, phyto-pathologie. [**Symptomatology and Comparative Pathology**]. pp. 239+48. [Numerous refs.] Paris: Masson et Cie. [8vo] [Fr. 50].

This book is written by a medical dermatologist who has carried out research work at the Veterinary School at Alfort, in collaboration with members of the

veterinary staff. A large variety of subjects is dealt with from the angle of comparative pathology, but there appears to be relatively little which is new.

The first chapter deals with venereal diseases in animals under natural and experimental conditions and, together with the useful references supplied, makes interesting reading. The second chapter deals with a condition in cats characterized by ulceration of the labial and buccal mucosa, formerly termed " cancroid ", which the author considers to be an eosinophilic granuloma, probably infectious in origin. The next chapter concerns neoplasms in animals and, in dealing with circumanal gland tumours in the dog, the lack of information as to the normal histology of these structures is regretted : in fact, however, an excellent description of these glands has been given by BALL and GIRARD [*V. B.* **9.** 728].

Among the tumours said to be caused by parasitic invasion, the author includes carcinoma of the liver in cattle, and lung tumours in sheep caused by strongyles. Even the various mange parasites are incriminated as causing neoplastic proliferation, but the evidence in support of these contentions is not by any means convincing.

Other contents include :– dermatosis, icterus, epilepsy, occupational diseases of veterinarians and, finally, a chapter on plant pathology.

There is no table of contents or index, and the references given are almost entirely to French work. There are no illustrations.

The book contains some interesting observations among its very varied contents, but many of the opinions expressed—often as though they were facts—should be treated with reserve.—E. G. WHITE.

BORDET, J. [Directeur de l'Institut Pasteur de Bruxelles, Membre étranger de la Société royale de Londres, Membre associé de l'Institut de France et de l'Académie des Sciences des Etats-Unis]. (1939). Traité de l'immunité dans les maladies infectieuses. **[Immunity to Infectious Diseases].** pp. v+879. Paris : Masson et Cie. [2nd Edit.] [4to] [$ 8.90].

The second edition of Bordet's book on immunity has appeared after an interval of 20 years. Bordet has largely contributed to our conception of the subject and in this work there is revealed a breadth of outlook which is refreshing. The study of immunity is treated as the story of a conflict, for life is conditioned by the maintenance of an equilibrium. This constant adjustment and re-adjustment is necessary because the circumstances in which living things exist are rarely perfect. There must be corrections and adaptations and the discipline of co-ordination sometimes means the excitation and sometimes the inhibition of different mechanisms.

After such an introduction, Bordet proceeds to analyse and discuss the influences which assist in or obstruct the production of the harmony of life. Pathogenic bacteria are dealt with, and the mechanism of invasion and toxin production and general aggressive qualities are discussed. Protozoa, metazoa and poisons of plant and animal origin are included in the general survey of what is harmful to the animal. The study of the host is then taken up, with chapters on the varied resistance to disease enjoyed by different individuals and species of animals and on the role played by age, heredity, previous infection and interference by artificial means.

The second and third sections of the book deal more specifically with the part played by the cells and the body fluids of the host in resistance. Tissue response to an infection may be negligible or, on the other hand, it may develop slowly in the manner peculiar to the infective granulomata. In this type of reaction there are produced many and varied cells but it is none the less a defence mechanism. Antibodies are brought into the picture and are treated according

to their test-tube reactions, their origin, their probable chemical nature and mode of union with antigenic substances. Wedged in towards the end of this third section is a chapter on antigens which includes a description of much of the modern work on the chemical conception of antigens and the production of artificial ones.

The fourth and final part collaborates the defence factors, and the evolution of disease processes is reviewed. Short resumés are given of the immunological aspect of some well-defined conditions which are referred to in general terms in the opening chapters. The examples include typhoid fever, Weil's disease, tuberculosis, plague, cholera, variola, foot and mouth disease, poliomyelitis, malaria and trypanosomiasis. Malignant neoplasms are included in this section and their aetiology and general tissue response are considered. The final chapter of all is on hypersensitiveness, including the phenomena of anaphylaxis and allergy.

The general impression given by the book is that the study of test-tube reactions and of cellular changes and the employment of experimental techniques are all subordinated to the understanding of what happens in the adaptation of a living organism to its surroundings. Immunity is a science of living and changing processes and this work is less of a text-book for examination purposes than a revelation of what we know and what we hope to know of this aspect of biology.

—R. Lovell.

Carpentier, G. [Docteur-vétérinaire, Licencié ès Sciences, Ex-Chef de Travaux de Parasitologie à l'Ecole Nationale Vétérinaire d'Alfort]. (1939). Parasites et maladies parasitaires des équidés domestiques. **[Parasites and Parasitic Diseases of Horses].** pp. xii+524. 242 figs., 1 photograph. [Numerous refs.] Paris: Vigot Frères. [4to] [Fr. 120].

This excellent book deals with the spirochaetes, protozoa, helminth parasites, arthropod parasites, and pathogenic fungi of the horse and the diseases which they cause. The author does not claim that it is a complete review of everything published on the subject, but that it contains all the essentials for the veterinarian. In the section on helminthology there is a very useful diagram showing the various eggs, larvae and plant spores and debris likely to be encountered in the faeces of the horse. The section on fungi is particularly useful, and consists of over 70 pages. The spelling is sometimes erratic, *e.g.* that of *Blepharoprosthium* on p. 97 and Rhabditidae on p. vii of the index.

Generally speaking, the parasites are very fully described and control of disease is dealt with. In as many cases as possiole, treatment is given and the commoner diseases, like mange and strongylosis, are described in great detail. The book will be very useful to all who are interested in parasitology in general, and veterinary surgeons, research workers and students will find their respective spheres of interest adequately dealt with. The book is one to be recommended as a valuable addition to the existing library of works on parasitology and an English translation would be welcomed.—A. L. Wilson.

Richters, C. E. [General und Chefveterinär des Heeres-Veterinäruntersuchungsamtes]. (1939.) Die Tiere im chemischen Kriege. **[Animals in Chemical Warfare].** pp. 280. 133 figs., 10 plates. [Numerous refs.] Berlin: Richard Schoetz. [4th Edit.] [8vo] [RM. 11.60].

Latest edition of a book of which the previous edition was reviewed in 1937 [*V. B.* **7.** 563]. The subject matter is extended and each chapter revised where necessary, with due consideration of practical veterinary requirements.

Chapter I provides a brief survey of the development and probable future of chemical warfare. Chapter II deals with the susceptibility of animals to war

gases, and Chapter III with the properties of the chemical compounds used and their general effects on the animal body, page 36 providing a useful tabulated summary of the chemical names and formulae, principal physical properties and military designations of the more important substances used. Chapter IV considers the special pathology and therapy of disorders caused by chemical warfare, and is subdivided according to military markings :– (1) " Green Cross ", *i.e.* volatile compounds of high toxicity such as phosgene alone or mixed with irritants, used with the primary object of killing the adversary ; (2) " Yellow Cross ", less volatile and without immediate irritant effect but ultimately damaging not only the eyes and respiratory passages but also the skin, and putting the enemy out of action for lengthy periods—the principal representatives being dichlordiethylsulphide (mustard gas, " yperite " or " Lost "), chlorvinyldichlorarsin (lewisite) and ethylarsindichloride (Dick) ; (3) " Blue Cross " generally of low volatility and low toxicity but with rapidly irritant properties designed to incapacitate quickly and compel the use of masks with special filters—the principal representatives being diphenylarsinchloride (Clark I), diphenylarsincyanide (Clark II), diphenylaminarsenchloride (Adamsite), and " tear gases " irritating the eyes in low concentrations, such as chloracetone, benzyl chloride and bromide, zylylbromide and brombenzylcyanide, and (4) others such as carbon monoxide and hydrocyanic acid gas.

Chapter V deals with products which form artificial clouds with atmospheric moisture, with or without previous oxidation or chemical nitration between components, such as chlorsulphonic acid, phosphorus, carbon tetrachloride and zinc dust (Berger mixture), titanium and zinc chloride with ammonia, the main purpose being interference with vision although many of them are irritant or caustic in sufficiently high concentration.

Chapter VI considers the dog as gas detector. Chapter VII deals with the protection of animals and food stuffs, and with methods of decontamination. The last chapter briefly discusses the possibilities of bacteriological warfare.

The book is well illustrated with photographic reproductions and coloured plates, and is well arranged with a good bibliography, contents index and author index.—H. H. Green.

Walter, H. E. [Emeritus Professor of Biology, Brown University]. (1938). **Genetics. An Introduction to the Study of Heredity.** pp. xvii+412. 148 figs., 9 appendixes. [Numerous refs.] London & New York: The Macmillan Company. [4th Edit.] [8vo] [12s. 6d.]

This book is stated to be the fourth edition, but this description would appear to be inaccurate, since the author states in the preface that he has written " a new book under an old title ".

The author covers the usual subject material commonly found in elementary text-books on genetics, treating the subject so that it may be understood by the reader who has no previous knowledge of the subject. The whole book is written primarily from a general biological approach, considerable emphasis being laid on the historical background from which the modern study of genetics has arisen. There is a useful section dealing with the application of elementary statistical methods to genetical problems. The two concluding chapters of the book and several of the appendixes deal with human eugenics and present a survey of the American attitude to the social problems involved.

To British readers the language and phraseology of this book may at times appear to be foreign to that commonly accepted for text-books. The book is excellently printed and contains many useful diagrams, and is profusely illustrated with photographs of the pioneer workers in biology and genetics. The bibliography consists chiefly of references to standard text-books and other works of a general nature.—N. J. Scorgie.

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